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AIRPLANE

THE WORLD'S PREMIER R/C MODELING MAGAZINE

48120

NEWS

February 1997

240MPH!

Speed Merchants at Madera



STANDOUT FINISHES!
POLISHED METAL &
PAINTED MARKINGS

GoFLYTE: Smartest
R/C Model at NASA



BIG SPLASH IN
BRITISH COLUMBIA

WE TEST:

SIG MFG. Profile Ultimate
THUNDER TIGER Trainer 60 • GREAT PLANES F4U Corsair

NEW FEATURE!



Readers' Gallery
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ON THE COVER: main photo—racer no. 111 comes in after another heat; deadstick landings save those expensive props. Insets—the cockpit detail of Jean Chevalier's Mystery Ship; the Thunder Tiger Trainer 60; a highly detailed Piper Cub at the Sandy Point Fall Classic.

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SLOW-FLIGHT DESIGN CONTEST WINNERS

When we conceived the slow-flight design contest nearly three years ago, we didn't expect the contest to proceed as slowly as the planes that entered, but sometimes things have a way of surprising you. We can now recap the history of the contest and report the results. Announced in the January '94 editorial, it was originally to conclude on December 31. Initially cosponsored by *Model Airplane News*, the NASA Langley Research Center and the NACA Alumni Association, contest sponsorship was quickly expanded to include the Shapery Gyronautics Corporation. Three classes of competition were defined. Two internal-combustion categories (displacement of between .40 and .50ci) included "floaters" with a wing loading of 15 ounces per square foot or lower and a "conventional aircraft" class with 20 ounces per square foot or greater wing loading. An indoor electric class was also established.

In our March '94 issue, with Shapery coming on-board, we increased cash prizes to \$1,500, \$825 and \$425 for first through third places in the conventional aircraft class. Prizes remained at \$1,000, \$500 and \$250 for the floater and indoor electric classes. Excited inquiries began pouring in. A flood of letters, faxes and email raised so many questions that we felt the need to publish a clarification of the rules in our September '94 issue.

Despite all the early inquiries, only two entries—both indoor electrics—had been submitted by the contest close. It seemed that the other contestants had fixated on the goal of hovering, and the power allowed just wasn't going to be enough. After both relaxing the rules and extending the deadline to July 1, 1995, five more entries arrived. These included a substantial conventional class effort by Kent Nichols of Salem, MO.

Duncan McIver, president of the NACA/NASA Alumni Association, coordinated the evaluation of the seven entries. The judges were the renowned NACA alumni Mr. W.

Hewitt Phillips, Mr. Willard S. "Woody" Blanchard Jr. and Mr. Robert A. Champine, all of whom share a longtime interest in model airplane design, development and testing. With their recommendations in hand, *Model Airplane News* selected prize winners and honorable mentions.

Adrian Palamarchuk and Richard Orobity of Daytona Beach, FL, have won a 1st-place prize of \$1,500 for their conventional class entry (see 3-view), and Kent Nichols has also won a 1st-place prize of



Adrian Palamarchuk and Richard Orobity teamed up to bring us the Manta, a split-delta VTOL aircraft. It's powered by a SuperTigre .61 spinning a 13x6 prop. This has proven sufficient to hover the aircraft and transition it to forward flight. It has completed one short forward flight following transition, but excessive pitch-control input by the pilot caused unpleasant results.

\$1,500 in this category. Kent's entry was somewhat similar in planform and concept to the Vertigo published by Tom Hunt in *Model Airplane News* in our August and September '94 issues, but included new concepts. Kent, with an eye on full-scale applications, later withdrew data on his model in order to safeguard his intellectual property rights.

Clyde Geist of Long Island (see photo) and Don Ross of Cresskill, NJ, each submitted indoor electric models that were flown at 4 and 6mph respectively (these were the only entries that included flight-speed numbers). Clyde received a 1st-place award of \$1,000 and Don, who built a



Clyde Geist's "Ceased Lightning" is a 60-inch wingspan, 900-square-inch aircraft with a wing loading of 0.775 ounce per square inch. Powered by a Mabuchi FA-130 motor, it flies at 3 to 4mph. Control is via outboard thrusters. Clyde uses the SG Corporation transmitter/receiver system for thruster control.

small Hi-Line Mini-6 powered aircraft of conventional design, took 2nd place for a \$500 prize. Honorable mentions who have been awarded two-year subscriptions to *Model Airplane News* include Mark McCray of Highlands Ranch, CO (tiltwing prototype), Yi Shen, of Endicott, NY (electric biplane) and Sergio Zigras of Paramus, NJ (indoor electric twin with variable throttle but no servos).

Our thanks to the NASA Langley Research Center, the NACA/NASA Alumni Association, Shapery Gyronautics, the modelers who entered the contest and all who participated.

WE HAVE A WEBSITE!

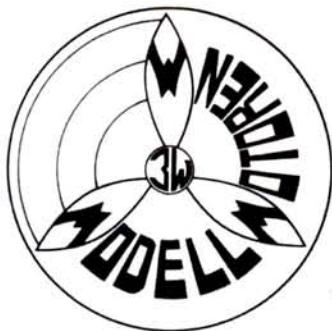
Model Airplane News has launched a new website! Go to www.airage.com and check us out. You'll find the initial phase of what will become a robust, content-rich site that will include recent R/C news, unique models, how-to information and much more.

ANNOUNCING "READERS' GALLERY"

We're also launching a new, bimonthly feature in *Model Airplane News* called "Readers' Gallery," which will showcase a significant model aircraft. This issue, we give you a tour of a model of Pancho Barnes' Travel Air *Mystery Ship*, constructed by well-known modeler Jean Chevalier.

LIFE IN THE FAST LANE

Madera! For those who follow R/C pylon racing, that name says it all. This month, we bring you eight full pages of coverage of this prestigious event. The planes, the people, the place—they all come together and spell excitement. ✦



A Proven Winner!



A 3W-120B2 powered Quique Somenzini to first place honors at the TOC.

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Mike Cherry, Roy L. Clough Jr., Hal deBolt, Bob Fiorenze,
Dave Gierke, Bill Griggs, Henry Haffke, Tom Hunt,
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PUBLISHING

Group Publisher LOUIS V. DeFRANCESCO JR.

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SHARON WARNER

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INTERNET man@airage.com

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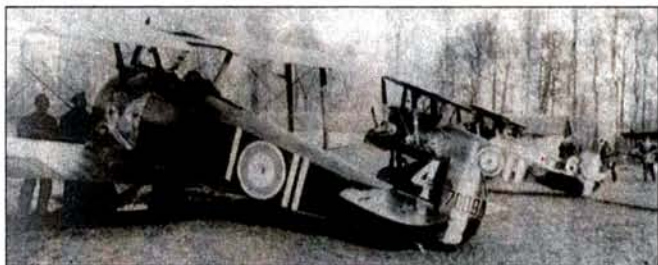


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WRITE TO US! We welcome your comments and suggestions. Letters should be addressed to "Airwaves," *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606; e-mail: man@airage.com. Letters may be edited for clarity and brevity. We regret that, owing to the tremendous number of letters we receive, we can not respond to every one.



This Sopwith Camel has the three vertical white bars that indicate that it is part of RAF 209 Squadron.

CAMEL COLORS

Please help me in finding a source for the colors used by Capt. Roy Brown on the Sopwith Camel he used when shooting down the Red Baron during WW I. I am building a scale model of this aircraft by Paul Guillow, but it does not provide this info. The kit box shows an artist's idea of using camo colors, which I doubt is authentic.

WALTER E.
BAILEY
Westkill, NY

When Capt. Roy Brown began chasing a red Fokker DR-1, the morning of April 21, 1918, his goal was to protect his buddy, Lt. May, whose guns had jammed. Little did he know how famous he was to become. Nor did he know the controversy that would transpire over whether he or Australian artillery troops were responsible for the death of Rittmeister Manfred Freiherr von Richtofen.

Even colors of WW I aircraft are open to considerable controversy, as it's often difficult to document them. But, Walter, within these limitations, you should be able to generate a "likeness" of Capt. Brown's Camel.

Most basic to RAF paint schemes during WW I is PC10, the olive drab that covered the fuselage and the upper surfaces of the wings. During the War, at least five subtly different colors were identified as PC10. The basic red/white/blue roundels also had color variations, but by 1918, the RAF adopted Identification Red (VR3), Identification White (VW3) and Identification Blue (VB2) as the standard. Another color requirement is clear doped

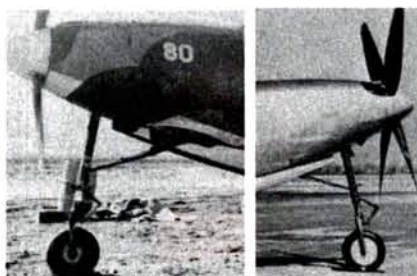
linen, which was the treatment used on the undersides of the wings and stabilizer.

These are British reference numbers to these colors, however, and so they need some translation before you head to the hobby shop. Lucky for us, David

Klaus compiled "The IPMS Color Cross-Reference Guide." This book allows us to translate the British numbers into Federal Standard (FS) color codes and then, using those codes, to cross-reference different brands of paint. Here's some data from Klaus:

British code	FS code	Equivalent paints
PC10 (olive) . . .	FS14087	Model Master 1711; Floquil M197
Doped linen . . .	FS13617	Floquil M195 is probably closest
VR3 (red)	FS11302	Pactra M8; Gunze Sangyo H023
VB2 (blue)	FS15056	Compucolor CIS7; Model Master 1772
VW3 (white) . . .	FS17722	Compucolor CIS5

Brown was part of Squadron 209 in April, 1918, and I've included a small photo to show you the three white bars on the side of the fuselage that indicated this squadron. Hopefully, this all too brief discussion of color matching helps you enjoy the hobby just a little bit more. LM



On the left is the nose gear of a P-39. On the right is a P-63 nose gear.

SCALE GUYS SEE MORE

As a retired jet fighter pilot and a model aircraft builder for 59 years, I enjoy reading your magazine tremendously. It is very interesting and especially informative. Please continue your splendid work.

Now I have a problem! Your P-47

product review was great, and I have built all the old Top Flite warbird kits and a few of the revised line. Still have a 1976 Top Flite P-47 flying now in my hangar. Also another vintage P-47 and a P-39. All the reciprocals and jets that I flew have had their scissors on the rearward side of the landing-gear struts. The model featured in your magazine has them on the front side of the struts. I have never flown the P-47, so the scissors location is not known to me. I have flown the P-51 and a few others, and their scissors are rearward.

CHALLEN IRVINE
Mesa, AZ

It never ceases to amaze me how observant scale modelers are when they're looking at an airplane. I don't know about you, Challen, but half the time, I never seem to notice (at least, not in time) that my wife has completely rearranged the house. But airplane details ... well, that's another matter entirely. It's a hobby within a hobby, and it sure is fun.

You're absolutely correct that the review of the Top Flite P-47 shows its landing gear torque links pointing forward. You're also correct that many planes, including the P-51, have them pointing rearward. But when Republic designed the P-47, they reversed them, and indeed, they do point forward on that type.

P-47s aren't unique in this regard. Take a look at the Bell P-39, and you'll see that the nose gear has the torque link rearward, but the Bell P-63 has it pointing forward (see photo).

Thanks a bunch for bringing this topic to our readers' attention. Did you also notice that Vic left the gear doors off so you could easily see these details (grin)?

LM

ERRATA

In the December '96 "Scoop," we provided an incorrect phone/fax number for Cactus Aviation. The correct number is (520) 721-0087. We apologize for any inconvenience this may have caused.



AirSCOOP

by CHRIS CHIANELLI

New products or people behind the scenes; my sources have been put on alert to get the scoop! In this column, you'll find new things that will, at times, cause consternation, and telepathic insults will probably be launched in my general direction! But who cares? It's you, the reader, who matters most! I spy for those who fly!

Keeping the Tradition



Airtronic's new Sapphire is barely into production, and it already has a string of first-place wins to its credit. The secret? It's Sapphire's triple-taper wing planform, which was developed by Joe Wurts (who won the 1996 Rosebowl Soaring Festival with the Sapphire) to improve low-speed handling, reduce drag and maximize launch performance. About the Sapphire, Airtronics claims, "This plane thermals, covers ground and launches better than any plane on the market." Now, I realize that's quite a brazen statement. I wouldn't even have printed it if it weren't for the fact that Airtronics isn't in the habit of making idle threats. I guess a list of wins (or lack thereof) will tell the full story. With its early wins, it seems that the first chapter is already unfolding.

Even back in the early '70s, Airtronics was known for very high-quality kits; I had more than one myself. With the Sapphire's contest-winning design, sleek "nose-cone" fuselage innovation, built-up tail surfaces and carbon-fiber spar wing, the Sapphire appears to be carrying on the tradition. Contact Airtronics Inc., 15311 Barranca Pky., Irvine, CA 92618; (714) 727-1474.

TIGERSHARK DELTA

If you haven't yet experienced a Delta, maybe now is the time.

They're lots of fun, and they don't stall! Designed for first-time delta-wing fliers when fitted with a .40 to .46 2-stroke, the Weston UK Tigershark is not only lots of fun but also a rock-steady and graceful flier that's capable of loops, rolls and inverted flight according to the distributor, Estes Industries. Building is quick and easy. Kit includes: pre-built fuselage, pre-shaped, solid-balsa delta wing and vertical fin. Any 3- or 4-channel radio is usable. The step-by-step instructions include an illustration for constructing a mechanical mixer for the elevons in case you don't have a radio with electronic mixing. Contact Estes Industries, 1295 H St., Penrose, CO 81240.



The Altech team has two new offerings I found very interesting. Needless to say, being the consummate 4-stroke

lover, I went nuts over the R1.55. This engine is very new, so all I can tell you for now is that it's based on the R1.20 case, so it should weigh about the same as the 1.20. Reports from Japan say it's one very "torquey" engine—even for a 4-stroke.

Because I long to be a bush pilot, I also like the new covered version of Altech's 72-inch-wingspan Pilatus Turbo-Porter. This model is not covered with iron-on film. It is covered with Coverite and painted! We will be taking a closer look at both of these items in the coming year.

The A-Team from left to right: Jeff, Akiko, Gabe, Alice, Mr. Ritota, Debra and Steve. Contact Altech at 80 Newfield Ave., Edison, NJ 08837-3817; (908) 225-2100; fax (908) 225-0091.



The A-Team

THE BEST OF BOTH WORLDS



Like the popular Four-Star 40 and 120, Sig's new Four-Star 60 is a blend of ultra-simple, all-wooden construction, classic looks and flight performance that can be characterized as the best of both worlds— aerobatic, yet (with a wing-loading of 17.7 to 20 ounces per square foot) as forgiving as a trainer. State-of-the-art CAD-drawn plans and laser-cut parts give precise parts fit and alignment. Specifications: wingspan—71 inches; area—920 inches; weight—7 to 8 pounds; engine requirements—.60 to .65 2-stroke or .65 to .90 4-stroke. For more information, contact Sig Mfg. Co. Inc., 401-7 S. Front St., Montezuma, IA 50171-9900; (515) 623-5154; fax (515) 623-3922; orders (800) 247-5008; email: flysig@netins.net.

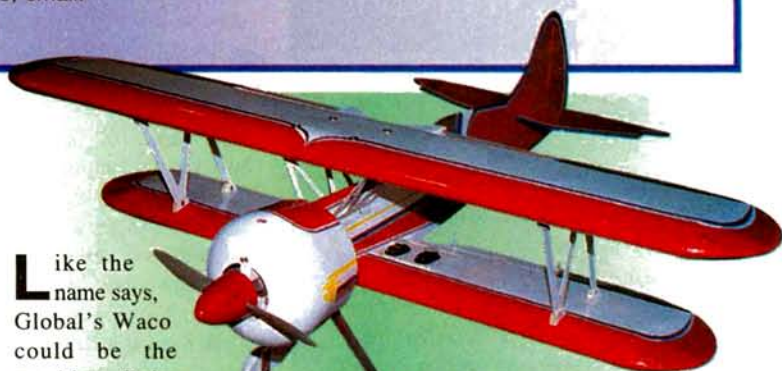
LA Blue

It's blue! What else can one say about the dazzling new O.S. .40 LA? Actually, quite a lot. Internally, it is much like an FP-series engine, being a Schnuerle-ported, bushing engine with an ABC-type piston and sleeve. ("type" meaning, like many other O.S. engines, the plating is nickel, not chrome).

The LA does, however, incorporate some interesting new features of its own. The obvious is the color (that actually may aid in cooling) and



streamlined appearance, which features more cooling-fin area for those hot and humid days our alcohol-burning engines hate. Less obvious is the added gusset webbing on the crankcase that strengthens high-stress areas susceptible to heat distortion. The remote needle valve puts fingers at a much safer distance from the prop and also features an Allen setscrew on the needle handle so an extension can be added for cowled-in installations. An overall tighter needle-valve fit cuts down on air leakage to help maintain more consistent fuel mixtures, and the nylon backplate eliminates metal-to-metal (crankpin-to-backplate) contact when starting with an electric starter. Possibly the FA .40's most dazzling feature is its suggested retail—only \$99.99. Contact Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826-9021; (217) 398-6300; fax; (217) 398-1104.



Like the name says, Global's Waco could be the wackiest flying, wildest-looking, fun-fly biplane I've ever seen. This thing is out there—way out there! Designed for all-out fun, this "over-the-top" biplane features two big symmetrical-airfoil wings, which sport over 1,000 square inches. Considering the design only weighs 6 pounds, we're talking serious "aero-antics" of a wing loading—something like 13.5 ounces per square foot. The big radial cowl hides the fuel tank—very trick. The Wacky Waco is designed for .46 to .61 2-stroke engines and has wingspans of 52.5 inches (top) and 46.5 inches (bottom). Watch for a review of this all-wooden kit this coming year. Also shown is Global's 48-inch-span ARF Spitfire. Designed for .30- to .36-size engines, this little all-wooden gem comes finished in Oracover, just as you see it here. Even the fiberglass cowl is painted. For more information, contact Global Hobby Distributors, 18480 Bandilier Cir., Fountain Valley, CA 92728-8610; (714) 964-0827; fax (714) 962-6452.

Wacky Waco

Supermarine ARF



For those of you who love to have fun, love the early days of jet propulsion and also demand immediate gratification, Dare Hobby Dist. has something just for you. It's the AeroTech Profile P-80 Shooting Star ducted-fan model. The P-80 features all plywood and balsa construction and uses Jet Hangar Hobbies' Turbax fan or any other 5- to 5 1/4-inch-diameter fan. Specifications: wingspan—52 inches; length—43 inches; weight—5 to 6 pounds; recommended engine—K&B 7.5cc DF engine with MAC pipe. If you want to reenact the Korean conflict, AeroTech also has an F-86 and a MiG-15 as part of their Profile Series. Will be available with optional landing gear. Contact Dare Hobby Dist., 551 N. Centre St., Cumberland, MD 21502; (301) 722-0356.



Profile of a Star

The Six-Foot Tucano

No, the six-foot Tucano isn't the title of a western. It's a 72-inch-span kit from DL Aeromodels Inc. in Canada. This latest version of this popular scale subject calls for a .90 to 1.08 2-stroke or 1.20 4-stroke engine. The kit features a lightweight epoxy/glass fuselage (which has molded-in panel lines and other surface detail) and separately molded engine hatch, belly-pan and cockpit floor. The wing cores (which are pre-routed for landing-gear installation) are cut from high-density virgin foam as are the stabilizers. All sheeting, precut balsa and plywood are included. A deluxe kit is offered, which features



sheeted surfaces (using epoxy) and installed landing-gear plates. Contact DL Aeromodels Inc., 4500 Knimber #8, Saint-Hubert, Quebec, Canada J3Y 8K5; (514) 445-1336.

Hitec's powerful new HS-85 Mighty Micro is a top ball-bearing-supported small servo (1.1x0.5x1.1 inches) that offers 31 oz.-in. of torque at 4.8 volts producing a transit time of 0.15 second. Available in both resin-gear and metal-gear versions, the diminutive HS-85 is perfect for small electrics, hand-launch gliders and even high-speed, slope-soaring machines. Available with Airtronics, Futaba-J and Hitec/JR connectors. Rumor has it, the price is excellent! For more information, contact Hitec/RCD, 10729 Wheatlands Ave., Ste. C, Santee, CA 92071; (619) 258-4940, fax (619) 449-1002.



The Mighty Micro Servo

Sundancer—a first for Byron

Long known for their giant-scale warbirds and jets, Byron Originals now introduces the Sundancer, their first sport plane for the Sunday fun-flier. The 77-inch, injection-molded wing halves are almost ready to cover while the fuselage and cowl are hand-molded fiberglass. Byron claims the Sundancer has fantastic slow-speed characteristics and is very docile, yet, at the same time, is aerobically responsive. The kit sells for \$289.95 and includes everything you'll need to complete the model, except for tires, fuel tank, engine, radio, glue and paint. Flying weight is 9 pounds and required power is a .45 to .60 2-stroke. For more information, contact Byron Originals Inc., P.O. Box 279, Ida Grove, IA 51445; (712) 364-3165; fax (712) 364-3901 or 2028.

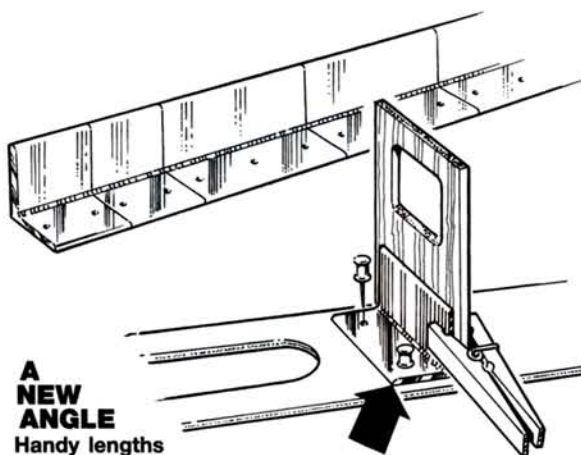




Hints & KINKS

by JIM NEWMAN

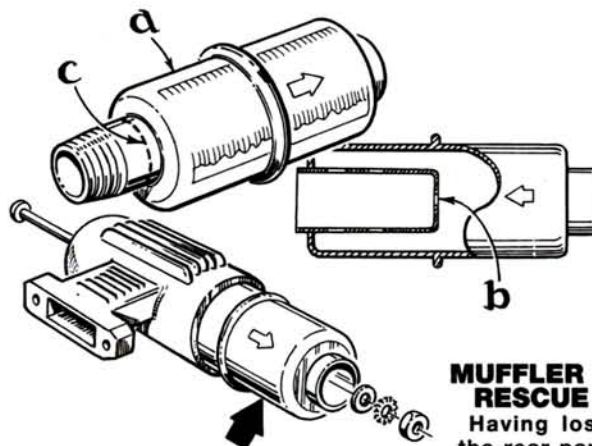
Model Airplane News will give a free one-year subscription (or one-year renewal, if you already subscribe) for each idea used in "Hints & Kinks." Send a rough sketch to Jim Newman c/o Model Airplane News, 100 East Ridge Ridgfield, CT. 06877-4606. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we can't acknowledge each one, nor can we return unused material.



A NEW ANGLE

Handy lengths of hardware-store aluminum angle, drilled to accept map tacks, can be used to hold formers, ribs, etc., vertical while gluing.

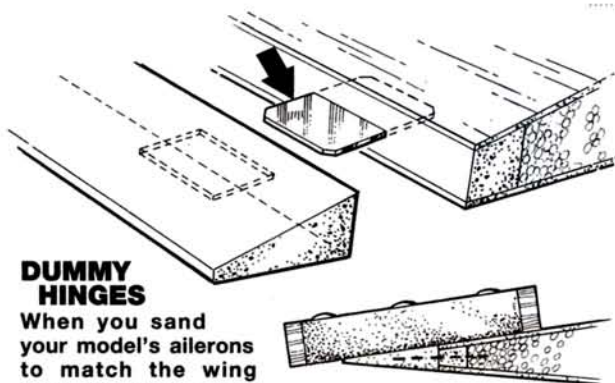
Robert Bubello, Meriden, CT



MUFFLER RESCUE

Having lost the rear part of his muffer, our reader bought an Ace Hardware muffer no. 72663 (a), drilled the baffle (b) for a $\frac{3}{16}$ -inch (5mm) bolt, then pushed the unit into the front housing, where it is retained with a nut and washers. Heat-resistant enamel dresses it up, and it works fine (and \$2 beats \$45 any day!). The stub might need to be cut off at (c).

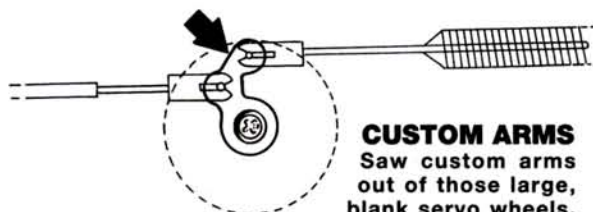
Manuel Acosta, Sonora, Mexico



DUMMY HINGES

When you sand your model's ailerons to match the wing contour, use metal tabs that are the same thickness as your hinges to hold the ailerons to the wings.

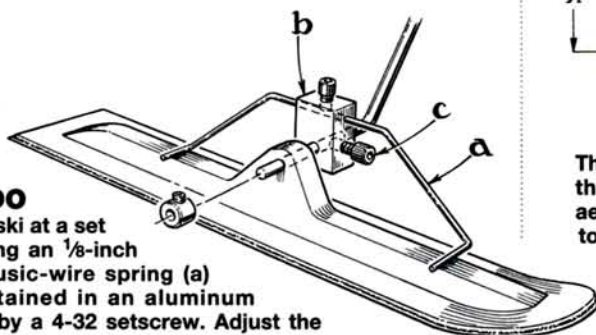
George Kasabian, Los Angeles, CA



CUSTOM ARMS

Saw custom arms out of those large, blank servo wheels. This one allows the use of snap-on keepers for the rudder and nose-gear pushrods. Those keepers are notorious for fouling a standard servo arm at extremes of travel.

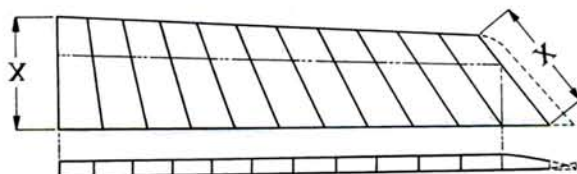
Robert Forrest, Newport-on-Tay, Scotland



SKI DO

Keep the ski at a set angle using an $\frac{1}{8}$ -inch (3mm) music-wire spring (a) that's retained in an aluminum block (b) by a 4-32 setscrew. Adjust the in-flight angle with the 6-32 setscrew (c) on the axle—neater than rubber bands and cords.

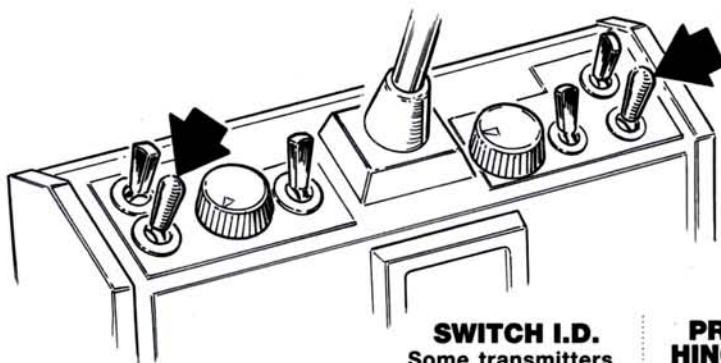
Chris Duncan, Victoria, BC, Canada



ALL SAME RIB

This tapered wing uses one size of rib throughout, with the ever-increasing angle creating the taper. A big aerodynamic advantage is that the wing's thickness-to-chord ratio progressively increases toward the tip and is good at low speeds. Better on a sheeted wing, too.

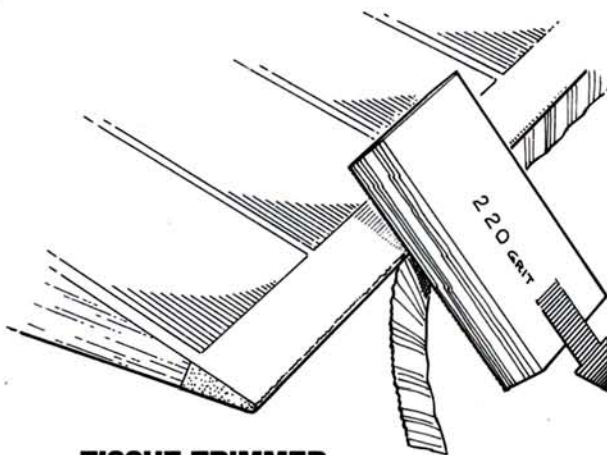
Gordon J. Rae, Great Malvern, Worcester, Great Britain



SWITCH I.D.

Some transmitters have rate and mix switches close together. To identify the rate switches without glancing down, slide rubber fuel line or those colored, soft-plastic caps over the rate-switch levers.

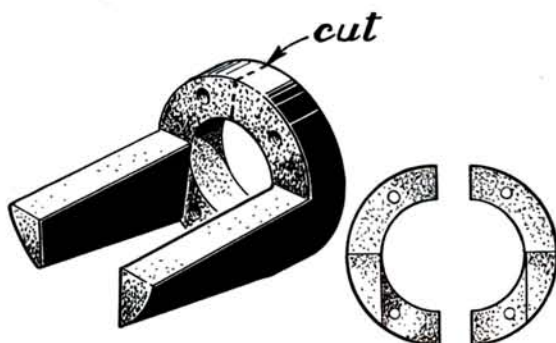
Dave Kovensky, Albuquerque, NM



TISSUE TRIMMER

To trim off excess tissue, gently stroke the corner of the covered piece with a 220-grit sanding block. This leaves a slightly ragged edge that all but disappears after the final smoothing.

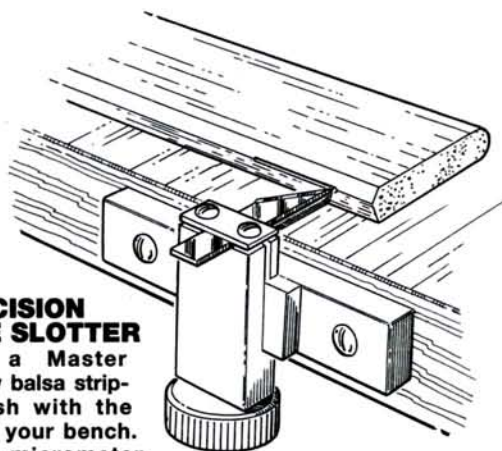
Andrew Wallace, Lynchburg, VA



TAILORED MOUNTS

If the beam spacing of your engine mount is too narrow for your engine, instead of filing the inside edges, just saw the whole thing down the center, then mount the halves individually, just as we did in the "old days"!

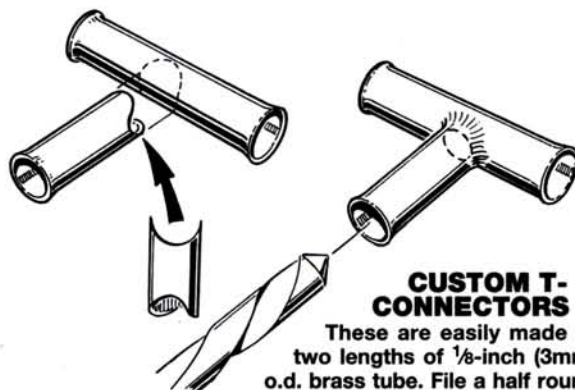
Michael Saponara, Flushing, NY



PRECISION HINGE SLOTTER

Install a Master Airscrew balsa stripper flush with the edge of your bench. Use the micrometer adjustment wheel to locate the control surface's exact center when you pierce hinge slots—especially on beveled edges, where those self-centering tools yield less-than-perfect results. Shim tapered-section (triangular) ailerons, etc., level before you slot them.

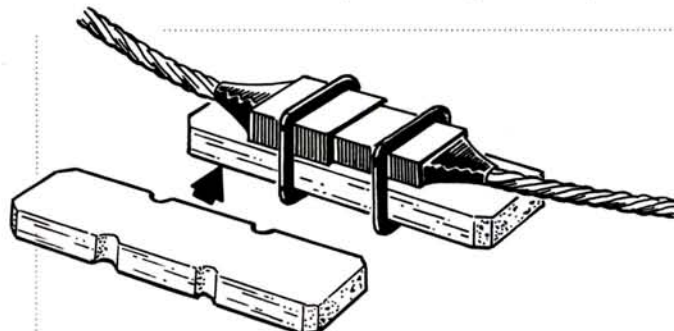
Alan Locklear, Austell, GA



CUSTOM T-CONNECTORS

These are easily made of two lengths of 1/8-inch (3mm) o.d. brass tube. File a half round in the end of one tube as shown, silver-solder the two tubes together, then drill through with a 3/32-inch (2.5mm) drill bit. Before you solder, slightly flare out the half round by inserting and tapping in a center punch; then smooth the edges with fine emery paper. The flared end will keep the fuel line in place.

Glen Milner, Elsternwick, Melbourne, Australia



SERVO-PLUG RETAINER

This simple balsa servo-lead retainer is ideal on an aileron servo-extension lead. An important feature is the grooves that keep the small O-rings in place. If the wings are knocked off, the plugs will still be able to separate.

R.G. Bond, Onteniente, Valencia, Spain ✦

Pilot PROJECTS

A LOOK AT WHAT OUR READERS ARE DOING

SEND IN YOUR SNAPSHOTS

Model Airplane News is your magazine and, as always, we encourage reader participation. In "Pilot Projects," we feature pictures from you—our readers. Both color slides and color prints are acceptable. We receive so many photographs that we are unable to return them.

All photos used in this section will be eligible for a grand prize of \$500, to be awarded at the end of 1997. The winner will be chosen from all entries published, so get a photo or two, plus a brief description, and send them in!

Send those pictures to: Pilot Projects, *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606.



Funz Ahoy!

These High Sierra R/C Club members of Carson City, NV, credit their Funz Ahoy models for their six Tri Club Shootout victories. Member Bob Hoy designed and built

the 3-pound, 4-ounce model, which is powered by an O.S. 32. According to member Bob Brogan, it "climbs like a rocket, glides like an eagle, lands like a helicopter, is as fast as a hawk and as aerobatic as a Pitts." What else is there to say? Congratulations!

Quacker Jack

Frank Giarmona of Sacramento, CA, kit-bashed this 96-inch-span Ace 4-120 biplane and covered it with black MonoKote. For the wood duck design—his own—he added gold, orange, red and green and 1/8-inch gold MonoKote striping. Frank says he powers his "bird" with a SuperTigre 3000 engine.



Thor Old-Timer

Neal Doty of Huntington Beach, CA, photographed his old-time 1938 Thor at El Mirage dry lake. Neal built the plane from a Klarich Custom Kits free-flight kit and converted it to R/C. The 72-inch-span model weighs 64 ounces and is powered by an Ohlsson .60 side-port engine. It has three channels: rudder, elevator and engine shut-off.



Lancer Pro

James Vier of Austin, TX, dressed up this Top Flite Corsair in Super MonoKote with a civilian paint scheme from Bob Banka's Scale Model Research. It's powered by a SuperTigre 90 spinning a 13x8 prop, and it has Robart retracts and functional flaps. It even *looks* fast, James!



Miss Blackwell

Ralph Beck of Beloit, WI, scratch-built this 1/4-scale Cessna GC-1 1930s race plane from his own drawings. The 81-inch-span model sports Williams Bros. Golden Age wheels and is powered by an O.S. 1.20 4-stroke. Ralph also built the pilot from scratch.





Canadian Fury

Richard Baylis of Westmount, Quebec, built this 10-pound, 1/8-scale Hawker Fury from the British Elite plans sold by Bob Holman. This military masterpiece is powered by a .75 ASP with a modified J'Tec in-cowl muffler. The covering is Silver Solartex from the U.K., and the paneling is simulated with silver MonoKote. The markings are computer-cut vinyl, with the exception of the white areas, which were spray-painted. The pilot figure is an AH Designs product, and the attached harness/parachute pack was created by Mrs. Baylis. Richard's aircraft is dressed in the colors of the commander of the No. 43 Squadron, also known as "The Fighting Cocks."



Gliding Giant

Claudio Marcotulli of Venezuela, a freshman at Embry-Riddle Aeronautical University, spent four years on this glider. Constructed of balsa, foam and fiberglass, the "El Chuti" weighs 18 pounds and has a 12-foot wingspan. The controls include eight servos and two separate battery packs.



Swiss Twins

Danny Baumann and his good friend Sandor Paszti of Winterthur,

Switzerland, built these exact-scale, CAP 231 EX French acrobatic models. Each model weighs just under 13 pounds, has a fiberglass fuselage and 73-inch-span, glass-covered foam wings. An Irvine 1.50 2-stroke engine and a Menz 18x8 prop keep each plane aloft. The decals represent a large Swiss brewery's new "ice beer," and the letters and ice-cube images on the fuselage and wings were computer-generated.



Miss Pelt

Challen Irvine of Mesa, AZ, built this Top Flite P-51D as a tribute to the Tuskegee airmen. Fashioned after Captain C.D. "Lucky" Lester's "Miss Pelt," it carries the exact markings found on the Captain's aircraft. The model is powered by an O.S. 1.20 FS, and it uses a 15x10 prop.



The Byron Breitling

E. Tait of Courtney, British Columbia, Canada, built this 80-inch-wingspan, 21-pound Byron CAP 231. The power comes from a J&A 4.2 engine that spins a 22x12 propeller. The finish is Hobbypoxy, and the decals were produced by F.M. Graph X.



Rainbow Bipe

This Balsa USA, EAA biplane kit built by Dom Martinelli of Utica, NY, has a 60-inch wingspan and weighs 9 1/2 pounds. The plane uses a 13x6 APC prop, and it's powered by a Rossi .61 with in-flight mixture control and a Slimline Pitts-style muffler. It has been modified to include forward hatches that allow access to the fuel tank. Dom covered and trimmed the plane with MonoKote, and the cowl, wheel pants and struts are coated in white polyurethane.

Using frisket masks effectively

Paint Aircraft Markings

by JIM RYAN



Aren't these results worth the effort?

ONE THING that separates an excellent model from one that is merely good is the quality of the graphics. This is especially true of scale models. For most modelers, decals are usually the first choice but, often, there are no decals available in the proper size or style. An excellent example is U.S. insignias of WW II. Not only were there four distinct changes in insignia styles from the outbreak of the war to the end of 1943, there were even variations for specific theaters of operations.



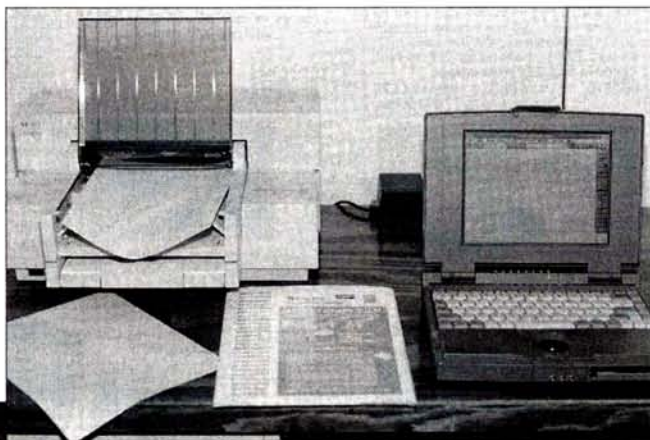
Cut gently through the film with a hobby knife, working on a pane of glass with a lamp underneath. Avoid cutting through the paper backing, as this helps to hold the film in position as you continue to cut. Remove the unwanted film as you go—a process called "weeding."

with it, you can paint duplicates of any insignia or make original graphics of your own design.

Frisket is a clear vinyl film with a special low-tack adhesive. Since it's vinyl, it will part cleanly even if you don't cut clear through it, and the low-tack adhesive helps prevent those panic-filled moments when you tear the underlying paint off while peeling the mask.

Because you don't have to cut clear through the film to get a clean parting line, it's possible to mask complex graphics by transferring the design to the frisket, applying the film to the model, and then lightly cutting the mask *right on the model*. I don't have that much faith in the steadiness of my hands, so I pretty much always cut the frisket *before* applying it to the model.

Another excellent use for frisket is for masking canopy framing. This is far easier than trying to mask the framing with tape, especially on heavily framed canopies like those on a Zero or an AT-6.



Although you can draw the graphic directly onto the frisket (or on its backing in a mirror image), I prefer to draw the graphics in AutoCAD and then simply feed the frisket through my printer. Another option is to transfer the image to the frisket with a copier.

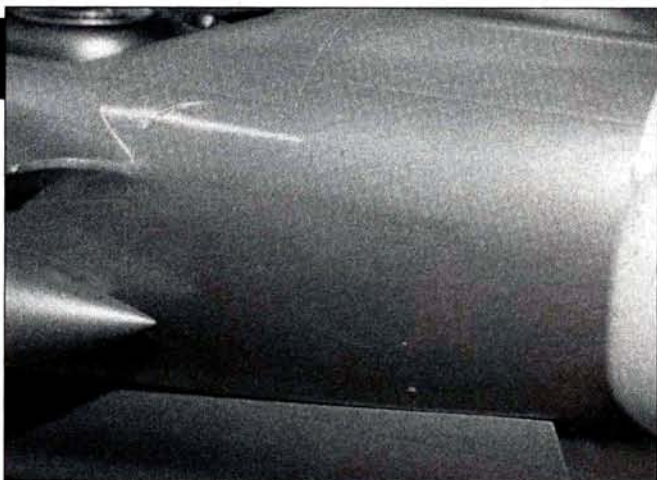
Many modelers conduct long and arduous searches for just the right decals or custom order them at a premium price. Then there remains the question of buzz numbers, squadron codes and other graphics for which there are no decals. Well, there's a better way, and it's as close as your local art-supply store. The material is called "frisket film," and

from the lightest colors to the darkest. This can make for some odd sequences. For instance, when painting WW II RAF aircraft, which have yellow border rings on the roundels, you should paint the roundels *first*, then mask them off and proceed with painting the rest of the model.

In the long run, I think you come out ahead if you start with an even base color, especially if you're going to be using colors with poor opacity like yellow. By

THE ZEN OF PAINT

Before we begin, a note on painting theory: it's intuitively obvious that the key to a lightweight paint job is to use as little paint as possible. And yet it's surprising how many modelers don't plan the sequence of color applications to minimize the number of coats needed for an even finish. To minimize paint weight, you should work



Paint from lightest to darkest colors, in this case, starting with white. To protect the surrounding aluminum surface, apply a negative mask that's slightly smaller (in this case, 1/8 inch) than the finished size of the insignia. Rub the frisket down firmly to make sure it's securely attached to the surface.

spraying on a light coat of aluminum paint, you not only get an even base color, but you can also detect any dings or defects that went unnoticed during priming. For water or mineral-spirit-based paints like acrylic, enamel or polyurethane, I like to use inexpensive Krylon "dull aluminum," available at auto-parts stores. For epoxy paints, I'd recommend their own aluminum color.

PRACTICAL APPLICATION

Frisket comes in two sizes and two finishes. First of all, you can buy it either in 8 1/2x11 sheets or long rolls and, second, it comes in either gloss or matte finishes. This is a matter of personal preference, and I've used all of

general types of frisket masks: positive masks and negative masks. Since you're going to work from light colors to dark, the type you'll use is really decided for you. For

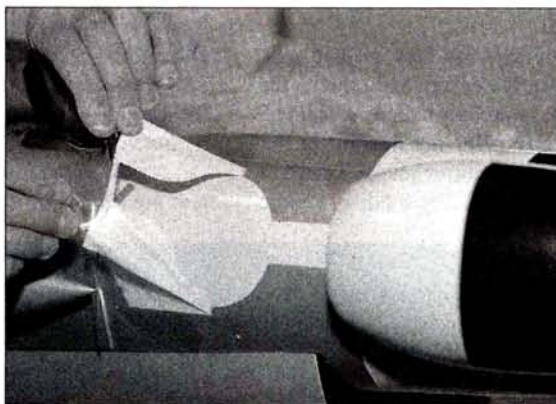
them with equal success. The rolled frisket can be less wasteful, in that you can use only as much as you need, and it's the only choice for very large insignias, but it's hard to get it to lie flat until you peel off the backing. For that reason, I usually buy the 8 1/2x11 sheets.

There are two general types of frisket masks: positive masks and negative masks. Since you're going to work from light colors to dark, the type you'll use is really decided for you. For

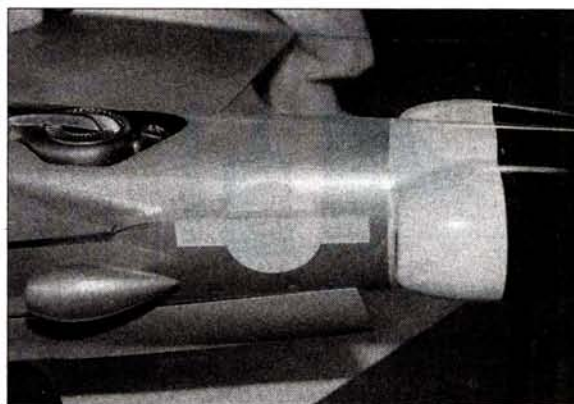
you'll want to paint the rest of the airframe before applying a *positive* mask and painting in the black letters.

Before applying the mask, be sure to clean the airframe and prepare it for paint application. Then, apply the mask, making sure to keep it straight. If you're working on a compound curve, the mask may resist lying flat at one corner. If so, slit the mask at an unobtrusive corner to take up the slack. The slight lack of squareness won't be noticeable. Once the mask is in place and carefully rubbed down, mask off the rest of the area with newspaper so that you don't get overspray on the airframe.

When painting graphics on very dull, matte paint (the frisket sticks much better to gloss or satin surfaces, and better to some types of paint than others), I suggest misting on a light coat of clear that's com-



Left: after the white paint has cured, gently peel the mask off the surface. The edges should be sharp and defined. Right: next, apply the negative masks for the blue. The mask around the outside edge is 1/8 inch bigger than the white base, and this allows the blue to cover the white completely, so there's no "halo" around the edge. Use a straightedge to guide the application of the star and bars masks, and after they're tacked in place, remove the straightedge, and rub them down firmly.



example, if the squadron code on your warbird is white on an olive drab background, you'll want to paint the general area white, apply a *negative* mask, and then paint the rest of the model. When finished, you'll remove the mask, revealing the white letters. If, on the other hand, the squadron code is black on a natural aluminum background,

patible with the paint system you're using before spraying the color. This helps to seal the edges of the frisket, and it's very cheap insurance.

There are several different ways to transfer your graphics to the frisket film. The most basic is simply to draw the graphic (in mirror image if it's not reversible) on the paper backing. This is fine for a one-off graphic, but it can get pretty tedious if you have to do it several times. You can save some time by drawing the design once and then using a photocopier to transfer the image to the film as many times as necessary. My personal favorite is to draw the

Now you're ready to apply the blue. Mist on the first two coats very lightly, as further insurance against bleeders. When you get a smooth, opaque surface, stop! The lighter the paint application, the better your markings will look.

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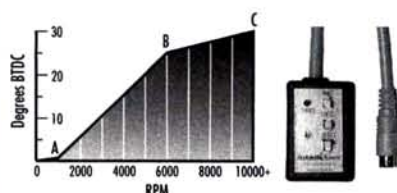
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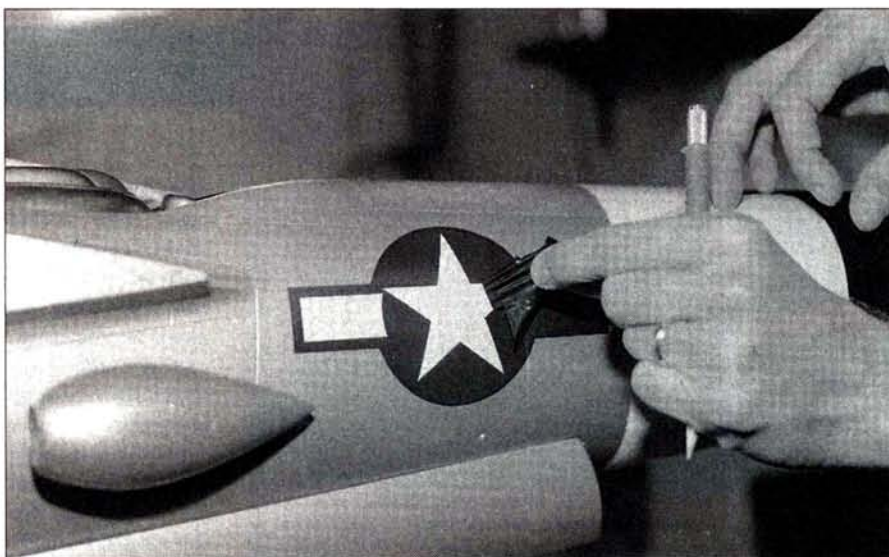
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PAINT AIRCRAFT MARKINGS



Resist the temptation to peel up the masks right away. If you let the paint dry past the "gummy" phase, you'll get a sharper edge on the markings. Gently lift the edge of a marking, and slowly peel the mask free. If everything went well, the marking will be razor-sharp.

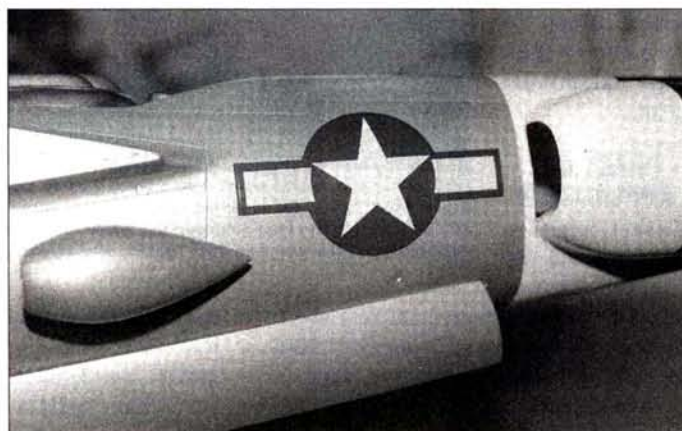
insignias or graphics in AutoCAD, and then simply feed the frisket into my printer. If you print the design on the paper backing, remember that it will need to be a mirror image.

Once the image has been printed, you need to cut out the design and remove the excess frisket, a process called "weeding." Since I usually print the design on the paper backing in a mirror image, I make a poor man's light table by holding a large pane of glass in my lap and setting a desk lamp on the floor under me. Work slowly, and cut as precisely as you can. Every over-cut or mistake in the mask will be replicated in the final product.

An airbrush is a real help in doing this kind of work, but painting graphics with spray cans is not difficult as long as you have the rest of the airframe protected from the extreme overspray. The first coat should be very light, as you want to finish sealing the edges of the frisket before applying a coat heavy enough to bleed under any loose areas. When you've misted on enough paint to get the desired finish, you should wait until the paint is

tack-free before removing the masks. This will help give you the sharpest possible edge. Carefully lift one corner with a hobby knife and ease the mask off the airframe. If you've done everything right, you should be greeted by a razor-sharp insignia, as if the aircraft had just rolled off the assembly line.

Squadron codes can be applied in the same way, depending on whether the letters are lighter or darker than the overall



Here's the finished product. This model is a true showpiece, and only painted graphics can do it justice.

color of the aircraft. Variations on this technique can be used to paint canopies, nose-art, serial numbers, or anything else that needs a sharp, defined edge. The best part is that you can make markings that would be impossible to find as decals. Besides, real paint looks better anyway! ✚

THIS test of the new F-91S 15cc 4-stroke engine was my first chance to see the results of the collaboration between Thunder Tiger and the renowned engine designer Kazuhiro Mihara of O.S. fame. His influence is clear in the engine's design and layout, but probably the most significant feature carried over from his O.S. period is the incessant pursuit of quality. Thunder Tiger's recent expansion of production facilities in mainland China may also have considerable repercussions if the present high quality is maintained in mass production.

MODEL AIRPLANE NEWS ENGINE REVIEW

by MIKE
BILLINTON

MECHANICAL FEATURES

- **Crankcase casting**—highly finished and one-piece, adding much to the engine's overall compactness and robustness. Despite its greater constructional complexity, this type is increasingly favored by manufacturers worldwide. A small lubrication hole feeds oil from the lower crankcase to the cam housing area (a feature sometimes missing from front-cam engines).
- **Cylinder head.** Made of aluminum, this is attached to the case by four bolts that are arranged to allow clearance for the exhaust passages. In pursuit of extra power, Thunder Tiger has made the inlet valve larger than the exhaust valve

sion ratio of 9.8:1.

The base for both the valve seat and guide is a single bronze insert that provides a valve seat of only 0.25mm (0.010 inch). This was a feature of earlier O.S. designs, but I don't know where it originated. It comes from the designer's awareness of the scale effect of a very small valve on the inertia involved, which, for effective sealing, demands both a soft valve seat together with very narrow width. A larger valve, on the other hand, develops higher closing forces and thus, must have wide and very hard seats to resist the impacts

- **Crankshaft**—a one-piece chromium/molybdenum steel unit with a hardened case. It incorporates the cam drive pinion. The crankpin itself has a high-quality ground finish to ensure long-term wear capability in the bronze bearing big end of the connecting rod. The propeller is attached using the nut-plus-locknut method—virtually essential on modern single-cylinder 4-strokes. Power strokes are relatively so severe that any half-hearted approach to prop attachment invites

a certain rejection of the prop.

- **Steel cylinder liner.** Thunder Tiger has tried several surface-hardening methods, such as chrome plating, nitriding and heat quenching, but currently uses nickel-plating honed to final finish and size.

- **Piston.** The short aluminum piston is lightened with both cut-aways and holes in the skirt (which also reduce friction). The wristpin is also unusually near to the piston crown, thus contributing to low overall engine height. The piston ring is cast iron with a polished external finish.

- **Carburetor.** The twin-needle 8mm-bore carburetor has the usual rotating barrel and incorporates a spring-loaded choke flap for cold starts; O-ring seals are fitted at all potential leak points.

Thunder Tiger's new 3-year warranty gives confidence to prospective users. Apart from being a marketing position, this suggests an increase in quality of workmanship and materials.

Thunder Tiger F-91S

Economic high-end performance

ENGINE LAYOUT

The F-91S is a quite compact sports 4-stroke, and it's clear that many of its features were designed for long-term reliability.

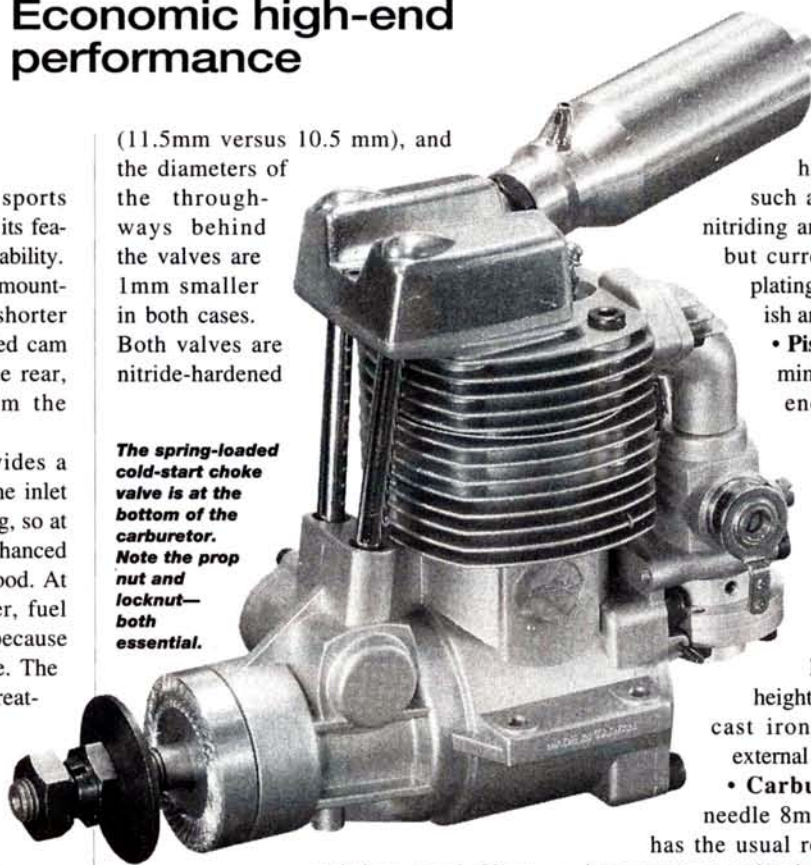
The camshaft and pushrods are mounted at the front, so the engine is shorter overall than those with rear-mounted cam drives, and the glow plug is at the rear, granting safe access away from the propeller.

The poppet-valve timing provides a large, 78-degree overlap between the inlet opening and the final exhaust closing, so at medium to higher rpm, power is enhanced and fuel consumption figures are good. At lower rpm (below 9,000), however, fuel consumption was unusually high because of losses through the exhaust valve. The power graph therefore shows the greatest fuel efficiency (specific fuel consumption) near the maximum rpm point.

In keeping with this bias toward medium to higher rpm, the recommended propeller sizes are from 16x6 to 11x10; these provide airborne rpm at between 8,500 and 12,500. Scale aircraft with wingspans of up to 100 inches would fly sedately with the F-91S and 12x6 prop, whereas that 11x10 and its 12,000rpm would be appropriate for small, more heavily loaded aerobatic craft.

(11.5mm versus 10.5 mm), and the diameters of the through-ways behind the valves are 1mm smaller in both cases. Both valves are nitride-hardened

The spring-loaded cold-start choke valve is at the bottom of the carburetor. Note the prop nut and locknut—both essential.



stainless steel. Very few model 4-stroke manufacturers use hardened valves because valve stem wear is the main problem rather than any need to have a hardened valve head. The angled valves form part of the shallow "pent-roof" combustion chamber that's fixed at a higher than average geometric compres-

WEIGHTS AND DIMENSIONS

Capacity	0.9133ci (14.96cc)
Bore	1.1155 in. (28.334mm)
Stroke	0.9345 in. (23.736mm)
Stroke/bore ratio	0.8377:1
Timing periods:	Inlet opens—50° BTDC closes—53° ABDC (total open—283°) Exhaust opens—75° BBDC closes—28° ATDC (total open—283°) Overlap—78°
Combustion volume	1.7cc
Compression ratio	Geometric—9.8:1
Cylinder-head squish	0.050 in. (1.27mm)
Cylinder-head squish area	0.08 sq.in. = 8% of piston area
Carburetor bore	0.3145 in. (8mm)
Crankshaft main diameter	0.5905 in. (15mm)
Crankpin diameter	0.275 in. (6.99mm)
Crankshaft nose thread	0.309 in.x24 TPI (5/16 UNF)
Wristpin diameter	0.2565 in. (6.52mm)
Connecting-rod centers	1.535 in. (39mm)
Engine height	4.65 in. (118.1mm)
Width	2.41 in. (61.2mm)
Length	3.50 in. (88.90mm)— backplate to prop driver 4.66 in. (118.4mm)—prop driver to rear choke valve
Mounting-hole dimensions	2.047x0.984x0.165 in. (52 x25x4.20mm)
Width between bearers	1.72 in. (43.70mm)
Frontal area	7.9 sq. in. (bare); 9.16 sq. in. (with muffler)
Weight	Bare—24 oz. (682gm); With muffler—25.8 oz (732g)
Crankshaft weight	3.95 oz. (112g)
Piston weight	0.35 oz. (10g)

PERFORMANCE

Maximum B.hp:	1.59 @ 13,540rpm (open exhaust and 10% nitro) 1.45 @ 12,716rpm (standard muffler and 10% nitro)
Maximum torque:	157 oz.-in. @ 7,230rpm (open exhaust and 10% nitro) 154 oz.-in. @ 6,580rpm (standard muffler and 10% nitro)

Hits

- Very high quality.
- Best fuel efficiency near max horsepower point.

Misses

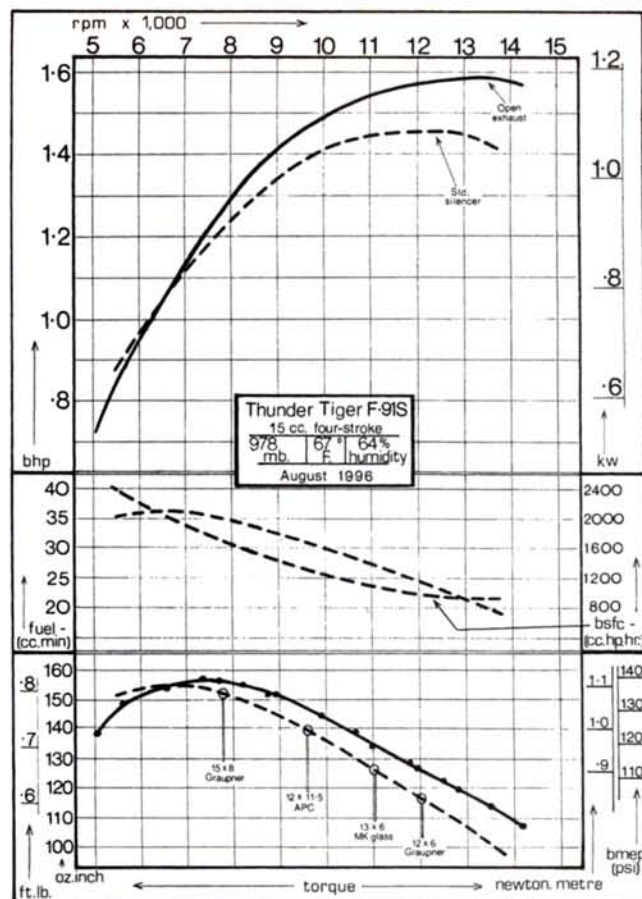
None found.

Comments

The liaison between Thunder Tiger and Kazuhiro Mihara is producing very high-quality, reliable sport engines and the Thunder Tiger .91S is one such example.

Manufacturer: Thunder Tiger, Taiwan, R.O.C.

USA distributor: Thunder Tiger USA, Inc. 2430 Lacy Lane #120, Dallas, TX 75006.



RPM ON STANDARD PROPELLERS

	Open exhaust	Std. muffler
18x7 Mastro	5,120	5,140
20x6 Zinger	5,370	5,390
16x6 Merali	7,200	7,190
15x8 Graupner	7,990	7,820
16x6 Airflow	8,040	7,990
15x8 APC		8,260
13.5x12.5 APC	8,330	8,235
13x10.5 MK Glass	8,850	8,720
15x7 Bolly Carbon	8,910	8,760
14x7 Graupner	8,930	8,800
12x12 APC	9,170	9,040
14x8 APC	9,340	9,230
12x11.5 APC	9,720	9,610
13x6 MK Glass	11,190	11,050
13x6 Top Flite M.	11,610	11,430
11x10 APC	11,920	11,710
12x6 Graupner	12,195	12,050

PERFORMANCE EQUIVALENTS

B.hp/ci	1.74	1.59
B.hp/cc	0.106	0.097
B.hp/lb	1.06	0.90
B.hp/kilo	2.33	1.98
B.hp/sq. in. frontal area	0.20	0.158
Oz.-in./ci	171.9	168.6
Oz.-in./cc	10.49	10.29
Oz.-in./lb	104.6	95.50
Nm/c.	0.075	0.073

PERFORMANCE

A 30-minute minimum run-in period seemed necessary. During and after break-in, I used a wide variety of propeller sizes. A rich fuel setting was always required; in fact, Thunder Tiger recommends that rpm be set 300 below maximum by deliberately

richening the fuel supply. Clearly, it's best to do this after partial run-in; such a fuel setting, with mid-throttle settings, will likely require that the glow plug is kept lit during this time. In the early stages, the 15cc cylinder capacity combined with the high compression ratio of almost 10:1

made mechanical starting a more viable approach. Later in the tests, I did hand-start the 91—mainly on the larger props (around 15 inches diameter).

- **Test 1. Open exhaust. Fuel:** 10 percent nitro/15 percent ML70 synthetic oil with 5

THUNDER TIGER F-91S





percent castor oil; the rest, methanol. Glow plug: Enya no 3.

The prop tests gave the information that rpm below 5,000 were not practical, so I began torque tests at that point, and approximately 50 percent of max. output proved to be available. All torque values were measured using slightly rich fuel settings. What looks like a notifiable disease on the open-exhaust torque curve are the various points actually measured. This is my attempt to show that torque curves are not, as some may think, made up of just three points—one at each end and one at the highest point! As can be seen, the F-91S produced quite consistent "on-the-line" figures; that no severe decline in torque is apparent even past 12,000rpm may be attributed to the valve-timing events mentioned earlier. (These favor the mid to high rpm.) The swift rise from the lower rpm end shows that the valve events are too extreme at low rpm and that fuel is being lost through the exhaust valve.

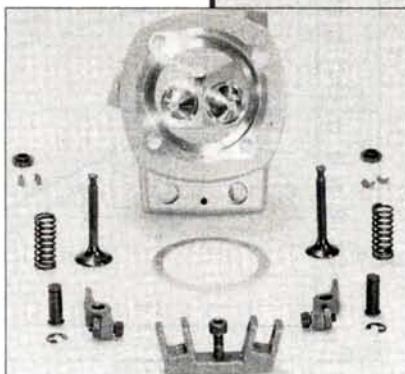
My measured horsepower max. of 1.59 is virtually identical to the manufacturer's claim of 1.6, but it was reached at rpm higher than Thunder Tiger's 11,000. This anomaly is almost certainly a result of their strong preference for users to keep rpm down to less stressful (and less noisy) levels. In any event, at rpm above 14,000, operation became unsteady, and there was more misfiring. I didn't establish the part played by the glow-ignition method in all this, but it seems to be an occasional feature of the 4-stroke/glow-ignition setup at high rpm.

• Test 2. Standard muffler. Same fuel and plug as in Test 1.

This backpressure muffler has an internal baffle and holes, providing a noise reducing "tortuous route" for exhaust-gas escape. Subjectively, I think its use reduced sound levels inside the test room, and of course, it was used for the subsequent outdoor dB checks. As the power graph shows, below 6,600rpm, it allowed more power release than the open-exhaust form, but from then on up the

Thunder Tiger F-91S Sport 4-stroke		Wind 3mph				
9 feet at AMA/USA	Graupner 15x8 (7,600 rpm)		93	91	88	92
	MK Glass 13x5 (11,000 rpm)		99	97	98	101
7 meters at BMFA/U.K.	Graupner 15x8		82	80	79	81
	MK Glass 13x6		89	84	87	89

Engine: Thunder Tiger F-91S
 Equipment: standard silencer
 Fuel: methanol with 10% nitro
 Temperature: 63°
 Humidity: 72%
 Pressure: 994mb
 Meter: Radio Shack type 33-2050 using GA601 calibrator set to NPL standards
 Height: meter and engine set approximately 1 meter above concrete
 Location: outdoors, next to farmland



The stainless-steel valves have been hardened by the nitriding process; this exceeds normal model 4-stroke manufacturing practice. The larger inlet port is at the left side of the cylinder head, though the inlet valve is shown at the right. Note the simple hardened rocker pedestal with its single bolt fixing.

it suggests that the actual dynamic restrictions inside the silencer are less than they appear. The fact that rpm continued to rise past 13,000 with little power loss is further proof of this point.

The dB results are shown separately, but it's worth comment here that the use of larger propellers (those holding rpm down to 8,000 and lower) for static running resulted in overheating if continued for more than 2 minutes at full throttle. Therefore, the dB test at 8,000rpm had to be done quickly. The signs of overheating were inability to hold fuel settings, reduced rpm—and heat! The higher rpm of 11,000 also used in the dB

rpm scale, the picture was more normal—that of relative reductions in torque and hp, around 8 percent down at 10,000 rpm. This is a quite small reduction given the degree of silencing available;

the forward speed itself provides most of the necessary air cooling. But the smaller prop at higher rpm gave the required airflow over the cylinder even when ground-based, so the engine was untroubled by the problem.

check did not lead to overheating, even though more hp was being developed. Therefore, the message is clear: the central area of big props at low rpm does not give much air draft over the cylinder. In flight, however,

the forward speed itself provides most of the necessary air cooling. But the smaller prop at higher rpm gave the required airflow over the cylinder even when ground-based, so the engine was untroubled by the problem.

IDLING

Using a 15x8 APC, the test fuel, standard muffler and its pressure tap connected to the fuel tank, allowed a final best idle of 1,600rpm (with careful manipulation of idle and main needles). However, this low figure is not a realistic option because it leaves the mid-range of the throttle markedly over-lean. The only way to handle this degree of non-linearity and make the mid-range transition acceptably correct was to use an over-rich idle-needle setting (one allowing a faster idle of 2,500rpm) and a half-turn richer main needle setting.

SUMMARY

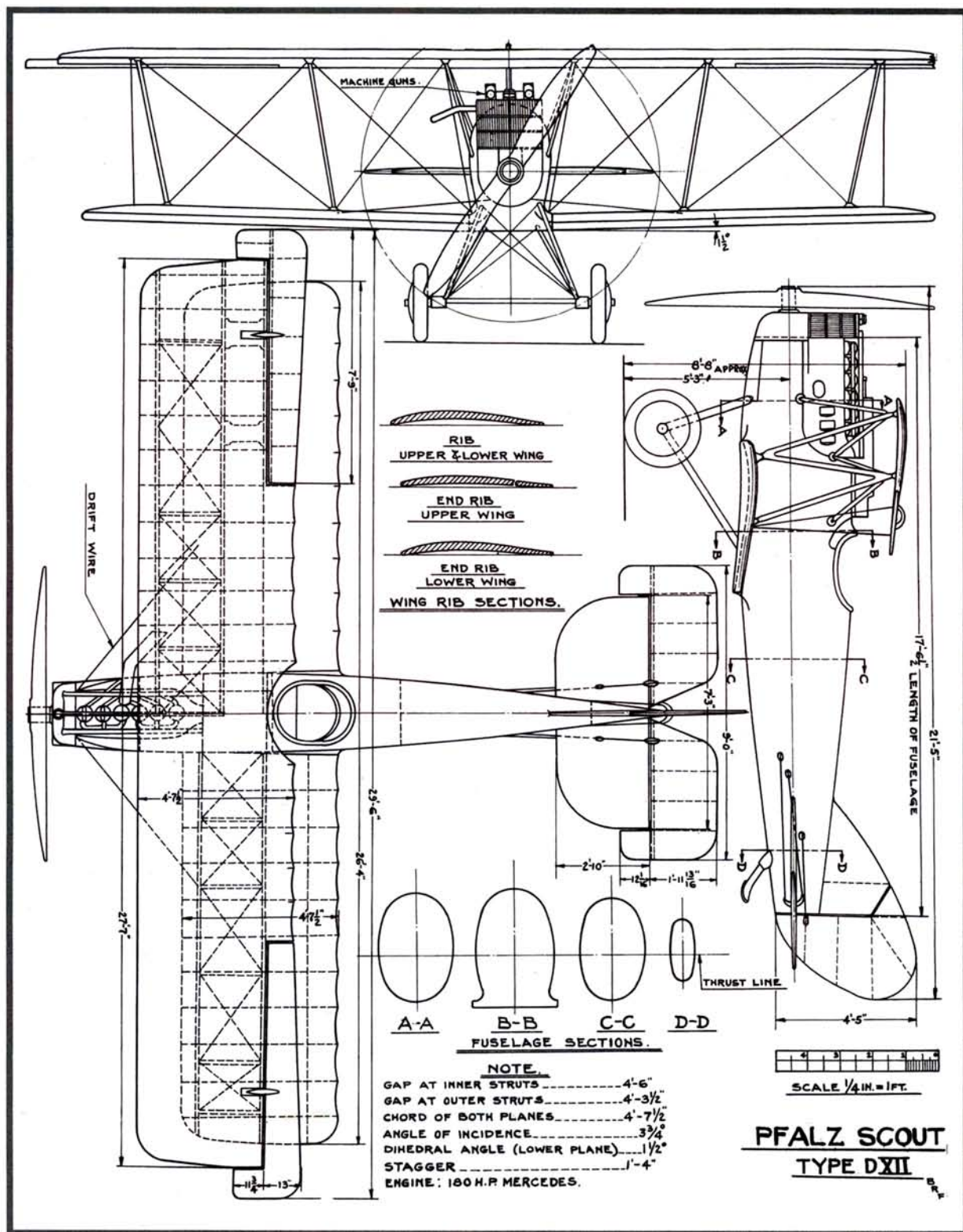
Compared with its 2-stroke counterpart, the single-cylinder 4-stroke model engine continues to be quite a "punchy" device, and this becomes more apparent as cylinder size increases. The F-91S is certainly no exception to this. It demands at least as much care in propeller choice and attachment as other 4-strokes do, as well as a continual user awareness of fuel settings.

As a separate matter, the quality of some recent Thunder Tiger engines, including this F-91S, raises expectations that possible comparisons with the very best can begin to be made. Whether this is a fear or a hope will probably depend on the individual perspective.



The connecting rod is bushed at both ends; the big end has two lube holes and the little end has one. The piston has been noticeably lightened, and the wristpin is hollow for the same "balancing" reasons.

Pfalz Scout D.XII



SPECIFICATIONS

Wingspan (top/bottom):
27 ft., 7 in./26 ft., 4 in.

Length: 17 ft., 6 1/2 in.

Wing area (top/bottom):
104.8/117.6 sq. ft.

The Pfalz Scout D.XII was designed in late 1917 as a high-performance, single-seat, pursuit plane. Powered by either a Mercedes 160hp or 180hp engine, the plane was quite advanced for its time, though it reached the front too late in the War to make a name for itself. Pilots found the D.XII to be stable and easy to fly, which suggests that it would fly well as a model.

READERS' GALLERY



Jean Chevalier with his winning Travel Air Mystery Ship. His static score at Rhinebeck was an impressive 96.5.

Travel Air Mystery Ship

by GERRY YARRISH

IF YOU'RE interested in the Golden Age of Aviation even a little bit, chances are you know who aviatrix Florence "Pancho" Barnes was. If not, then do you remember the bar scene in the movie "The Right Stuff"? She was the woman who owned the bar and served up drinks to pilots like Gus Grissom and Chuck Yeager. In her youth, she flew the Travel Air Mystery Ship in the Thompson Trophy Air Race in 1931. Her top speed was an amazing 241mph. The same aircraft was originally piloted by Doug Davis, who raced it in 1929. At a speed of 194.69mph, Doug beat the top Army and Navy aircraft at the time.

Traveling across the U.S. and Canada to attend many prestigious scale competitions, Jean Chevalier of Lacolle, Quebec, Canada, chose Pancho's aircraft for his latest masterpiece. Involved in modeling for 30 years, Jean has competed at Top Gun, the New England Scale Masters Qualifier and a host of other competition and giant-scale fun-fly



It's a tight cockpit for the small Pancho Barnes pilot figure.

Ship, built from a partial kit from Fred Reeves*, took three months of full-time work to complete. In flight, the model is rock-steady and very stable, but landings are demanding. Jean states that three out of five of his landings are good. Completing the scale illusion, the pilot figure is a miniature of Pancho Barnes and was

A dummy radial engine and a beautifully detailed homemade static propeller dress up the Mystery Ship.

rallies. Catching up with Jean at the 30th annual Rhinebeck WW I Jamboree, we had a chance to check out his beautifully executed Mystery Ship. Jean won first place in the AMA 513 Sport Scale class at Rhinebeck (his third year in a row in the winners' circle).

Jean says that the 1/4-scale Mystery



Pancho Barnes' Golden Age Racer

SPECIFICATIONS

Type: 1/4-scale Travel Air *Mystery Ship*

Wingspan: 88 in.

Weight: 22 lb.

Construction: fiberglass fuselage, cowl and wheel pants; built-up wing

Finish: Randolph dope

Radio: Futaba® 8UAP

Engine: Quadra® 52 w/Slimline® muffler

Time to build: 3 months (full time)

Comments: built by Jean Chevalier from a Fred Reeves partial kit, the Travel Air *Mystery Ship* uses the same paint scheme that was used on Pancho Barnes' famous race plane.

handmade by Jean's wife, Diane. Pilots by Diane now sells custom, handmade pilots at all the scale contests that Jean competes in.

Jean has also been restoring full-size aircraft for 15 years and has bought, rebuilt, flown and sold 27 classic aircraft. Jean and his *Mystery Ship* have just been invited by Frank

Tiano to compete at the 1997 Top Gun competition in West Palm Beach, FL. Looks like Jean has another long trip ahead of him.

**Addresses are listed alphabetically in the Index of Manufacturers on page 131.*

Below left: rib stitches and pinked tape add to the model's full-size appearance. The finish is Randolph dope. Below right: landing-gear detail complete with wheel pants and rigging-wire detail.



by TERRY NITSCH

SIMULATING ALUMINUM SKIN on scale-model aircraft is not only a unique challenge, but today, it's also almost a requirement for a scale competitor who wants to win the "big one." So many of the aircraft we model today, such as warbirds, jets and even homebuilt aircraft, actually have the unpainted aluminum surfaces, or skins. To

Apply Polished-Aluminum Panels

receive maximum scores in competition, these skins must be reproduced accurately. Models that have been painted silver to simulate aluminum can't compete with models that have been skinned with a "metalized" product. There are several such products available, and each one requires a different



Metal finishes made easy

technique to achieve the most authentic results. I usually use Coverite* Presto metallic covering and an aluminum detailing foil sold by Foley Mfg.*

As with any finishing job, the surfaces that will be coated must be prepared; the model should be glassed and primed. Surface defects will be visible through any of the foil coverings, and they'll be emphasized by the covering's mirror finish.

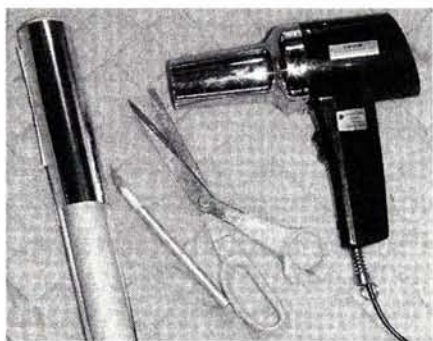
PRIMING

Priming the model is important to enhancing the final effect. I use K&B* two-part epoxy primer, which is easy to work with and to sand. It's white right out of the can, but it can be tinted with the various K&B paints. A small gap will always exist between each metalized panel; the secret is to tint your primer so that these small spaces enhance the model and provide depth to its surface. A medium-to-dark charcoal gray primer usually works best.

WORKING WITH PRESTO

Applying the foil or aluminum panels is next. I like to start at the nose and work "radially" around the model toward the tail. When it's heated, Presto metallic covering will stretch, but it will *not* shrink. At this point, 3-views that show panel sizes and their locations are very helpful. Panels on full-scale aircraft are sized and shaped to perform certain functions; the extent to which aluminum skins can be formed is limited. I've found that scale panel sizes and shapes that are proportional to their full-scale counterparts can usually be applied without too much difficulty. When you try to do several panels with one piece of Presto, however, wrinkling and stretching become problems.

- If your fuselage does not already have molded-in panel lines, use a soft lead pencil to lay out the approximate panel locations. Mask the first panel's perimeter with 1/8-inch fine-line tape (available at automotive-supply stores).
- With scissors, cut the Presto approximately 1/2 inch larger than the desired panel shape.
- With a *good-quality* tack cloth, wipe your hands, the panel that's to be covered and *both* sides of the Presto panel.
- Carefully peel off its backing, and position the Presto.
- Starting along one edge, slowly press the Presto onto the model, gently sweeping your finger back and forth while you hold the other end of the Presto off the model. This method allows you to work all the air bubbles and wrinkles out as you move across the panel. If air or dirt becomes trapped under the Presto, just peel it off and start again.



The tools necessary to complete the job: scissors, an X-Acto knife, a heat gun and covering material. The only items not pictured are the fine-line tape and the tack cloth.

- With your fingernail, crease the Presto down along the tape's edges, and use a sharp X-Acto blade and a flexible straight-edge to trim it to meet the tape.
- Peel away the fine-line tape, and the panel is finished. Areas of separation, e.g., hatch openings and disk breaks, and compound curves require a different approach.

APPLYING THE PANEL

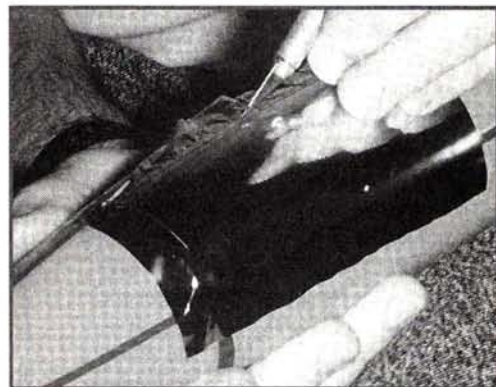
- **Fuselage.** I like to stick the panel down along the center of the fuselage and, using heat, slowly stretch the material out. When half of the panel has been applied, stretch the other half from the center out, and trim it to fit. If the surface curves are too severe, several smaller panels may be required. Over time, the Presto may peel away from

panels that have exposed edges, such as those around hatch openings, gear doors and brakes. To avoid this problem, wipe these edges with a soft cloth that has been dampened with K&B thinner. Apply the Presto immediately after the thinner has dried.

Gaseous residue from the K&B thinner will actually "melt" the Presto adhesive onto the model. Any panels that have to be replaced will leave their adhesive behind. This residue can be removed with K&B thinner before the new panel is applied. Continue this process, panel by panel, until your fuselage is complete.

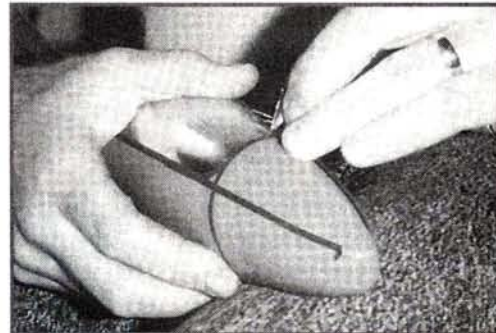
- **Wings.** Wings are really no different to cover, but the panels are usually quite a bit larger. A slight change in

the application method will help eliminate dirt and air bubbles on these large areas. After you've trimmed your Presto panel so that it's 1 inch larger all around than is necessary, peel *one* edge—not the whole piece—away from the backing. Stick this edge to the model, and while you work the

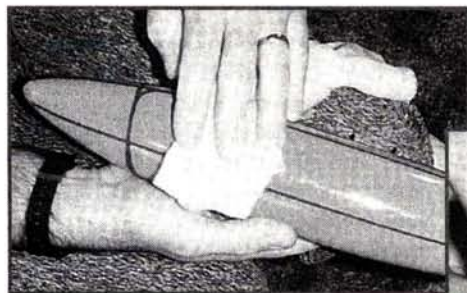


5 Use a sharp hobby knife and a flexible straight-edge to trim away the excess Presto.

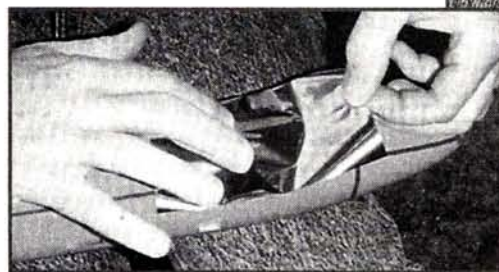
3 The author uses a heat gun to stretch the Presto over the model's surface. Presto will stretch when heat is applied, but it won't shrink.



6 Carefully peel back the excess Presto, and continue the rest of the covering.

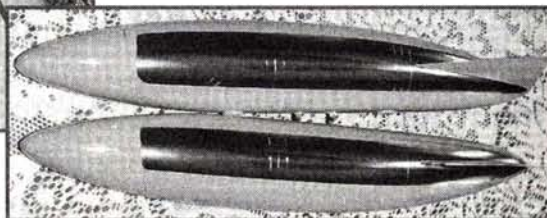


1 After the wing tank has been covered and the perimeter tape has been applied, the tack cloth is used to clean the surface to which the covering will be stuck.



2 Coverite Presto is applied to the wing tank. For this procedure, be sure to follow the directions in the text.

4 To define the lines needed for trimming around the covering's perimeter, use your fingernail to crease the Presto down along the tape edges.



7 When you've finished trimming, peel off the fine-line tape, and you have a beautiful reproduction of an aluminum-skinned surface.

APPLY POLISHED-ALUMINUM PANELS

Presto down with your fingers, gradually roll the backing off the panel as you apply it. With this method, large panels can be applied easily and with minimal waste.

BLENDING METAL AND PAINT

There are several schools of thought on how metalized panels can be blended into painted areas of the model. One possibility is to cover the entire model with Presto and then mask and paint the appropriate areas. I've also heard of modelers extending one panel of the Presto into the painted areas. To simulate panel seams, I use $\frac{1}{64}$ -inch drafting tape to mask and spray all the painted areas first. It's simple: apply the $\frac{1}{64}$ -inch tape around the panel perimeters, spray the model, and then peel off the tape. The remaining grooves look realistic, and they match up well with the Presto panels.

Then apply the Presto to all the open, non-painted areas of the model, and trim every panel carefully along the masked edge. A good French-curve-style template cut out of thin plastic or flexible template material is helpful when you trim along painted edges.

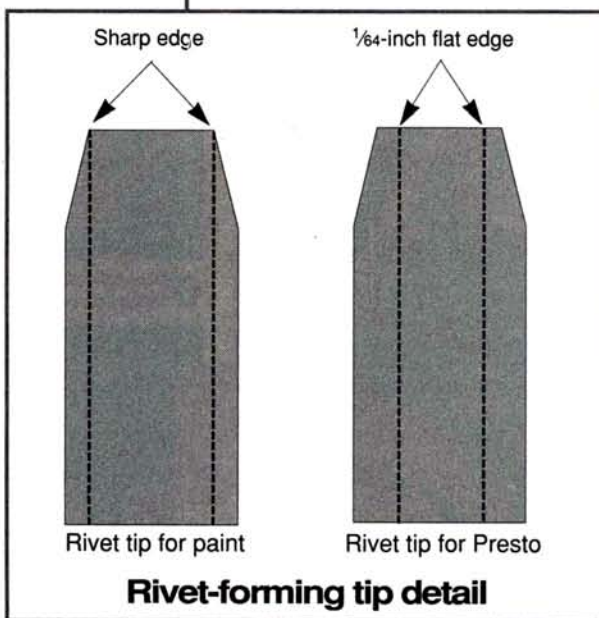
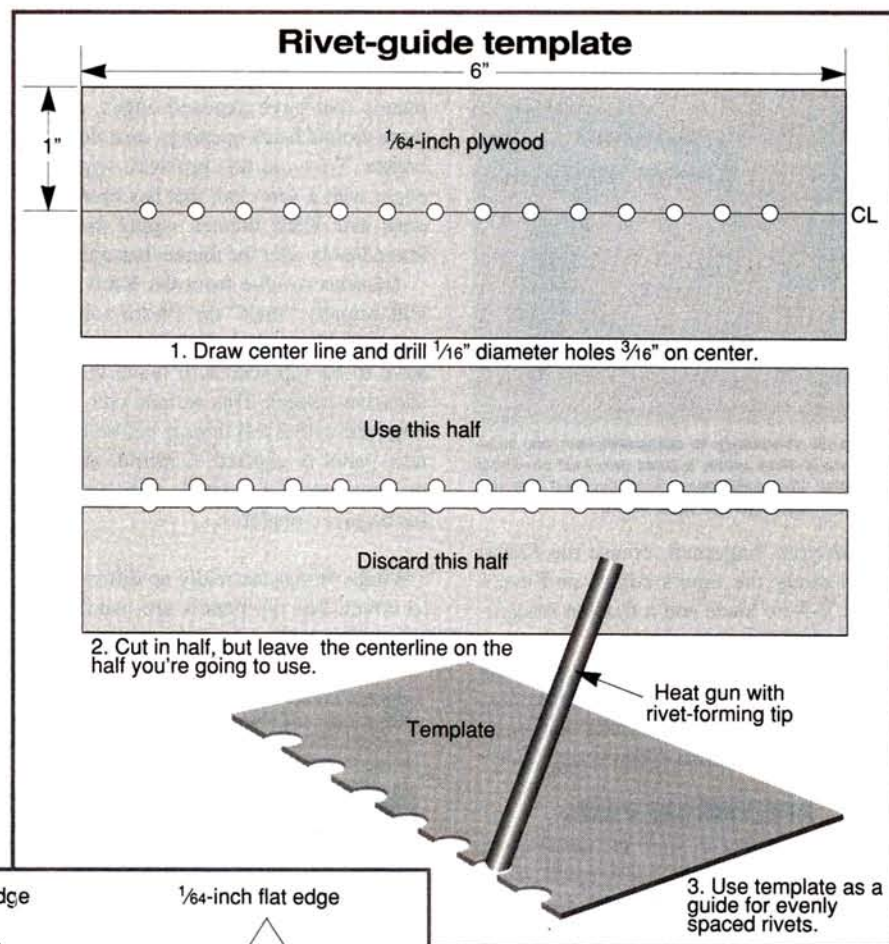
REALISTIC DETAILS

• **Hatches and doors.** To simulate hatches, doors, etc., use Foley Mfg. 0.005-inch-thick aluminum, detailing foil. It's adhesive-backed, and it's coated on the front to accept paint. To allow a natural aluminum finish, the coating can be removed with thinner.

Hatches, panels and various shapes can be cut out of this product and applied to the model's surface. Be very careful not to touch the adhesive on the back; fingerprints reduce its adhesiveness. Because it's slightly thicker than the surrounding material, this product produces effects that greatly enhance the model's appearance. To create hatches that share the same polished-aluminum look as the rest of the model, I put Presto over the Foley foil. Apply the Presto before you cut the panel to shape.

• **Rivets.** The most frequently asked question is probably, "How do you make those rivets look so realistic on scale models?"

Burning in rivets yields the most realistic results. Though it isn't a new idea,



Outlines of the different tips needed to create rivets on covered surfaces and painted surfaces. Great care must be taken when making "rivets."

melt a donut shape into the plastic on the Presto's surface.

Temperature and pressure are critical. If the tool's tip is too hot, the plastic will "string out" as the tool is pulled away. With too much pressure, you'll burn a hole right through the Presto. The key is to practice on something else and perfect your technique before you "rivet" the model. I like the tip to be warm enough that minimal pressure is required. If the Presto starts to become stringy, simply blow on the tip to cool it just enough to continue.

burning rivets into Presto requires a slightly different technique and heat-gun tip. The necessary tools for painted surfaces are typical: a small pencil-type wood-burning tool, a rheostat to control temperature and a $\frac{1}{16}$ -inch brass tube sharpened as shown in Figure A. For "riveting" Presto, the tip configuration must be shaped as shown in Figure B. To "rivet" paint, you want the tip to simultaneously burn and cut a small ring through the paint. To "rivet" Presto, you want to

• **Evenly spaced rivets.** The second most frequently asked question is how to maintain even spacing between rivets. I've tried using rulers, flexible straightedges and other measuring devices; they work OK, but after a while, the eyestrain becomes overwhelming, and you make mistakes. My biggest success was the result of using a very simple, 1-inch-wide, 6-inch-long, flexible template made of $\frac{1}{64}$ -inch-thick plywood. To make it, draw a lengthwise centerline, and carefully mark and drill a series

of 1/16-inch holes on 3/16-inch centers. Saw the strip almost in half (leave the centerline on the side to be used). You now have a simple, flexible, non-scratching template.

Position this template next to your panel seam, and let the rivet tool nestle into each scallop in the wood; as you apply pressure, you produce a rivet—very simple and very effective.

For models that require raised rivets, aluminum powder can be mixed with Zap* Formula-560 glue. Use a glue gun or a syringe to place drops at each rivet location. Mike Barbee of Columbus, OH, has developed a neat technique for applying raised rivets. He dips the teeth from a curling-iron comb into the adhesive and presses the teeth against the model to produce about 20 perfectly spaced rivets at a time! It's a great time-saver.

GRAPHICS AND CLEARCOATING

For the graphics and clearcoating, I've used AeroLoft* dry transfers over metallic

coverings with excellent results. For the best results, they should be applied after the rivets have been made. Burned-in rivets create an additional dimension in both paint and Presto. When a dry transfer has been placed over such a rivet and burnished down, the rivet shows through the transfer, and this produces a truly authentic look.

Before you apply any paint to the Presto covering,

it's important to use a suitable bonding agent. There are two products on the market (available at automotive-supply stores) that work very well. Jerry Caudle has produced excellent results with Plastic Magic (no. 1050-4). I've used SEM's flexible Bumper Primer (no. 39864) with equally good results. Both products are clear, and a light coat is required before any top coating can be applied. I know of an instance where a standard bonding clear was used, and it didn't work.

**This process
is tedious and
time-consuming, but
the results are worth
the effort.**

WEATHERING

For authenticity, the model's surface must be weathered. Presto is best suited to the highly polished aluminum look, but you can dull it by burnishing the surface with no. 000 steel wool. I like to do this after the clearcoat has been applied. If the dulling is overdone, some of the gloss can be restored with a high-grade polishing compound. In cases where more severe weathering is required, burnish the surface without first applying any clearcoat at all.

Masking off various adjacent panels and burnishing them in directions 90 degrees apart adds a nice, grain effect and distinguishes each panel. To enhance weathering, apply pastel chalk with a coarse brush; charcoal gray and dark browns work best.

This process is tedious and time-consuming, but the results are worth the effort. When your metalized model is at the field or a contest, and you're asked, "Wow! How did you get that realistic-looking metal finish?" you can be proud of yourself and your new-found skills.

*Addresses are listed alphabetically in the Index of Manufacturers on page 131.

Strut The Right Stuff with RoboStruts



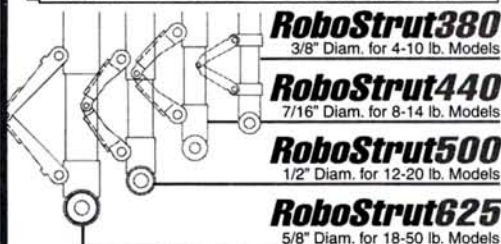
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Golden **AGE OF R/C**

by HAL deBOLT

PYLON RACING DEVELOPMENTS

HERE'S MORE of the history of R/C pylon racing. I'll begin with thanks to Clarence Lee and Gil Horstman for their extensive input on this subject. Without their help, we would have missed a lot of information. Clarence is familiar to many of us. Gil—if you haven't heard of him—was one of the early National Miniature Pylon Racing Association (NMPRA) officers who "slaved" for it for several years.

When we think of pylon racing, NMPRA quickly comes to mind. About the time the Goodyear event got under way, Jerry Nelson saw the need for a national organization to watch over what was becoming a widespread activity. So, Jerry and his cohorts put together what now is the NMPRA. Ed Shipe, an early president and ambitious PR booster, kept the ball rolling. Most prominent racing R/C'ers also served in one way or another.

Besides safeguarding the good of racing, NMPRA sponsors an annual national championship race. NMPRA rules divide the country into districts; you accumulate racing points during the year in your own district. If you rank among the top 10 scorers in your district, you'll become eligible for the championship race. Thus, each year, the NMPRA championship race is a true gathering of racing eagles. The championship offers the finest racing in the world, and the winner wears a prestigious crown!

PYLON RULES

In early days, the Goodyear Corp. sponsored full-scale midget racing events. When a model pylon race was contemplated, the objective was to duplicate the full-scale midget events. The First All Speed Team (FAST), a model club in California, was interested in all kinds of model speed flying. When Jerry Nelson envisioned true model pylon racing, he presented the concept to the club, which, after study, put together a set of rules that aren't very different from today's Formula I rules. The minimum specifications for the airplane were a wing area of 450 square inches, a weight of 4½



L.A.'s Ray Downs with his K&B .40-powered "Shoestring" Goodyear racer.

pounds and an engine displacement of .40, and the model had to be a replica (not true scale) of a full-scale racer. After several trial races, FAST determined that, with only minor changes, its proposed rules would be suitable. The next step was to seek AMA approval.

The AMA racing committee that included Howard Bonner, Howard McEntee and I reviewed the finalized rules and had one comment: when you scale a full-scale to model size, the fuselage has grotesque proportions, and it lacks the sleek appearance of real racers—not good. We suggested this option: the model could be a replica or it could be a prototype that resembled a full-scale racer. Along with slight changes, these rules were adopted as the basis of the official AMA Goodyear event.

Among the first successful racers was Howard Bonner, who won the first FAST race, and Joe Martin, who took the first Goodyear race at Turlock, CA. The Goodyear event remained on exhibition status for the '65 and '66 Nats. The event's popularity was apparent when the number of entrants jumped from 17 in '65 to more than 30 in '66. It attracted prominent modelers such as Jim Kirkland, Cliff Weirick, Dale Nutter and Maxey Hester. A Wood-Weirick O.S. .40-powered Midget Mustang won the '65 event in a close competition with Ray Down's Johnson-powered Shoestring. The '66 event saw a close fly-off between Phil Kraft and Kirkland, with Kraft on top. Hester won the consolation race!

FIRST GOODYEAR NATS

The first official AMA Goodyear Nats event was held in 1967 in Los



Dave Gierke (right) assisted as Hal deBolt prepared his prototype Goodyear racer at an Orange, MA, race. Note the strong resemblance to full-scale.



A later-day AMA Nats pylon meet: Continental-rules models (left) and Goodyear-rules models (right).



Leo Martin relished the deBolt "Special" Goodyear racer (from *Model Airplane News* plans, June '67) for sport flying.

Angeles, where 78 entries showed that pylon racing's popularity had grown. Here's a story from that day. After he had won his last heat, Cliff Weirick thought he had won the event. So after he crossed the finish line, he pulled vertical, and in jubilation, he allowed his model to fly almost out of sight, then roll over into a vertical dive, with no recovery! The result was a hole in the runway and hundreds of bits and pieces! Unfortunately, when the smoke cleared, the score revealed that Joe Foster had won; his "Rivets" had a perfect score.

At this time, one problem that the AMA committee observed in the Goodyear event was that the speedy models were very specialized and not much good for anything but racing. In those early days, R/C systems were extremely expensive, and money was tight. The committee thought that such

specialization and expense would hamper the event's development. To attract newcomers, perhaps the event's scope could be broadened.

Popular sport R/Cs were .40-powered and featured wing areas of about 600 square inches, so the AMA racing committee established a second pylon racing event called the Continental. It differed from the Goodyear in two ways. First, the wing areas now had a minimum area of about 600 square inches; this also made the Continental racer an excellent sport flier. The second difference was appearance. Continental models could be patterned after any plane that had ever raced, and this opened the door to numerous possibilities.

BIRTH OF NMPRA

As the Goodyear and Continental events progressed, critical problems became evident. For example, the rules required stock engines. Enforcing this rule became a headache because competitors had found that increased power meant more victories. Fortunately, both K&B and SuperTigre soon produced legitimate racing .40s for the

events, so the word "stock" remained. As with any racing, it was not long before some of the serious competitors again began to push the rule. As a result, today's rules have extensive engine restrictions.

When Goodyear ended its sponsorship of full-scale racing, these events were renamed Formula I and Formula II.

As happened with C/L speed, Formula racing has lost its multitudes of participants over the years. It is still alive and well, however, and it attracts serious racers who push for ever higher speeds. Consider this: in the first Goodyear races, the challenge was to break the 2-minute barrier; now, it seems someone will soon clock less than 1 minute! Isn't progress great?

As you may suspect, there is still more racing history to cover, so stay tuned!



Kend Landefeld fired up the S.T. 40 in the Gierke-Landefeld P40Q Formula II racer at the '72 Nats.

John Grigg: a Tribute

So sorry to have lost another stalwart of model aviation and the AMA, John Grigg. In his impressive Vandyke beard, he visited me often and offered me welcome personal advice. We went back a long way both in modeling and in friendship.

John was a chief aeronautical engineer with the Sierra Research Corp., a government supplier at the Buffalo International airport. Because the facility was near my home, noon get-togethers were convenient, and we always looked forward to them!

John became a serious modeler in 1942 and was one of the organizers of the first AMA C/L club in his area, the Flying Dutchmen. He was instrumental in obtaining the Niagara County R/C facility, one of the world's finest. Imagine a close-cropped runway 600x1,400 feet long and county-maintained! He offered seemingly unlimited assistance for all local modeling activities and was a friend to all modelers!

John's modeling endeavors extended from free flight and C/L to R/C. In later years, as a member of the Clarence Soaring Society, he found gliders and electric power of most interest. His models were always immaculate.

Because of his executive experience, John realized that model aviation's future relied on an organization, our AMA. In 1947, anxious to do his part, he became District II vice president. Then, beginning in 1981, he served two terms as AMA president. John's intuition and knowledge served the AMA well during some trying times. Later, when he felt he had still more to offer, he again served as District II vice president.

Even when terminally ill, John never lost interest, and in his last days, he made what must have been a great effort to attend the Celebration of Eagles at Muncie, and, even later, the Flying Aces Nationals in Genesee, NY.

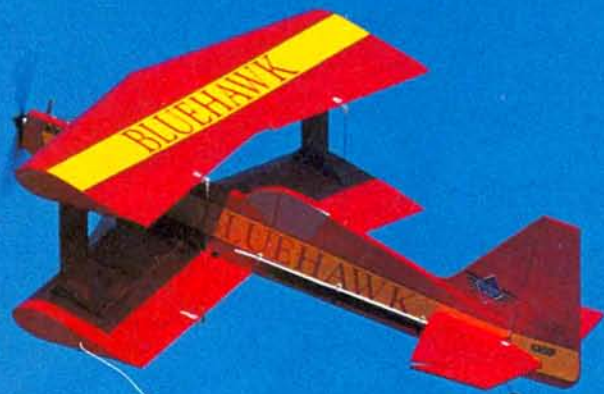
In honor of his many contributions, he received the AMA's Meritorious Service Award and our many thanks! John's right hand was his wife of 45 years, Joan. Together they enjoyed spending time with daughters Gail and Linda and their three grandchildren.

We will surely miss this fine modeler, gentleman and friend to many!



Sig Mfg.

Ultimate Fun Fly



The next step
in profile
performance

by DAN LUCHACO

When Sig Mfg.* decided to add another profile to the Sig line, designer Mike Pratt chose the Ultimate Aircraft 10 DASH 300S. The full-scale plane has been around since 1985, and many R/C versions have been built. Mike thought that the biplane would be "a natural for a fun-fly model—quick, responsive and aerobatic." He was right.



A fun-fly model builder and competitor since 1971, I've built all types of designs in an effort to find the ideal fun-fly aircraft. Profile designs have provided improved performance, but storing and transporting these one-piece models can be a challenge. The new Sig Ultimate has one item that other profiles lack: removable wings. As soon as I heard this, I added the Ultimate to my "plan to build" list.

THE KIT

I've always wanted a kit that was so well engineered that I could put some glue in the kit box, shake it a few times and open the box to find a completed model. The Ultimate is very close to that type of kit, and building it was a real pleasure. The kit comes with laser-cut balsa and plywood parts, a glass-filled engine mount, pushrod and control-surface horns, screw and accessory hardware, plastic wheel pants, hinges and adhesive-backed decals. All that's required to complete the model is a spinner, a fuel tank, wheels, covering and fuelproof paint for the wheel pants and other plastic parts.

The illustrated construction manual is very complete, and it also covers control surface throws, optional mixing setup, balancing, preflight inspection and flight.



A lot of engineering went into this kit, including the critical alignment and placement of the precut wing and strut screw hole mounts and preshaped ailerons and leading and trailing edges.

CONSTRUCTION

I followed the construction manual to assemble the major components. Alignment tabs on the tail-surface parts were a nice touch. The fit of the rib notches, precut webbing, spars and sheeting provided two

the elevator servo, also mounted with double-sided tape. The switch is fastened to the left side hatch, and I routed the charge plug out the pushrod fairing. A charge-plug receptacle could be fastened to the hatch if desired. Both hatches have the pushrod fairings tapered to allow easy removal of the pushrods for bottom wing removal.

The throttle pushrod consists of music wire with a clevis at each end. The elevator and rudder pushrods supplied in the kit consisted of music wire passing through pieces of Nyrod tubing held in place by U-clamps. Although the supplied pushrods were more than adequate, I decided to install Sullivan* Nyrod tubing the full length of each pushrod, with the inner rod over the supplied music wire. This method provided a more rigid control setup for the tail surfaces. The aileron servos are mounted

on hardwood rails located in the middle of each bottom wing panel, with the horns and music-wire pushrods located on the bottom of each wing. A music-wire aileron pushrod connects the top-wing ailerons. Paper tubes built into the bottom wing route the aileron servo leads to the receiver area. One extension lead is required to complete the hook-up. The receiver antenna is routed through a tubing built into the left panel of the bottom wing, exiting out the tip rib. All of this installation is clearly shown on the plans and in the construction manual.

FINAL ASSEMBLY AND FINISHING

I covered the model with less than two rolls of Dark Red Super MonoKote* and used the provided decals for detail. Use the "soap method" described in the manual to apply all decals. I sealed the edges of the decals with clear Hobbypoxy*. I installed the tail surfaces after covering and then hinged all movable surfaces. Next, I installed



The tail feathers have plenty of area for wild aerobatics. With the externally mounted pushrods, setup is simple.

rugged, straight wings. Tabs on the ribs allow you to build on a flat surface, even though the ribs are symmetrical. The preshaped fuse has precut stab and tail slots, cabane area, engine mount and doubler areas. After fitting the O.S.* .46 engine on the engine mounts, I just followed the manual to complete construction. Be sure to follow the wing construction procedure as printed to prevent building in any warps.

RADIO INSTALLATION

The radio installation has some unique features. The complete system is installed into the bottom wing. The receiver is in the leading-edge area of the right side of the wing. The battery pack is located in the leading-edge area of the left side of the wing. Foam rubber is packed around these items to keep them in place. The throttle and rudder servo are mounted to a formed ABS servo hatch. The throttle servo is screwed to two hardwood blocks glued to the hatch. The rudder servo is attached to the hatch with double-sided tape, and the arm is positioned in a fairing that provides access to the rudder pushrod clevis. This hatch is applied to the right side of the wing. The left side, formed ABS hatch has

SPECIFICATIONS

Model: Ultimate Fun Fly

Type: profile sport biplane

Manufacturer: Sig Mfg.

Wingspans: 42 in. (top and bottom)

Wing area: 798 sq. in.

Weight: 4 lb., 8 oz.

Length: 43.5 in.

Engine req'd: .32 to .46ci 2-stroke, .40 to .50ci 4-stroke

Engine used: O.S. .46ci 2-stroke

Radio req'd: 4 channels, 5 servos—rudder, elevator, throttle and ailerons (2)

List price: \$89.95

Features: laser-cut balsa and plywood, pre-shaped leading and trailing edges, aluminum landing gear, complete hardware package, large decal sheets and photo-illustrated instruction book.

Comments: this is a good example of a profile fun-fly plane. It is more maneuverable than most sport planes, but it can be handled by any pilot above the trainer-plane skill level. Construction is straightforward, and a computer radio is not required for this design. I enjoyed both building and flying this biplane.

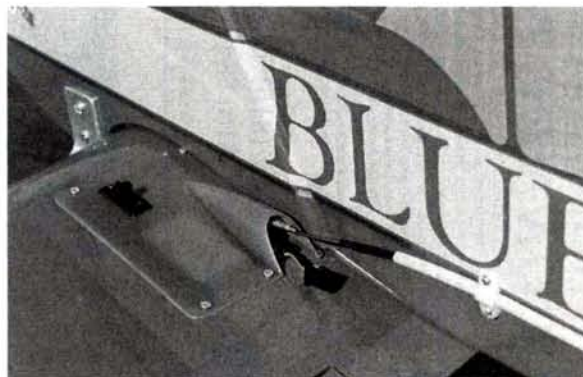
Hits

- High-quality laser-cutting and good parts fit.
- Good instructions.
- Excellent balsa quality.
- Complete hardware included.
- Large decal sheets.

Misses

- No spare nylon bolts included for wing and strut mounting.

the hardware, followed by the O.S. .46 engine and muffler and 4-ounce Sullivan tank. I opted not to install the provided wheel pants. I applied Dave Brown wheels to the main landing gear, with a Sullivan tailwheel in the rear.



Rudder and elevator servos are mounted on plastic hatch covers on the top of the bottom wing. The arrangement is neat, and it allows easy access to the equipment.

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SIG MFG. ULTIMATE FUN FLY

FLIGHT PERFORMANCE

• Takeoff and landing

The Ultimate tracks fine and the tail rises as soon as it reaches flying speed. Slight up-elevator, and you are on the way. The dual landing gear and steerable tailwheel provide solid tracking and ground control.

Approach to landing is slow and true. The thick wings provide good air braking, and three-wheel landings are simple to perform. Aileron control is positive, right to point of touchdown.



• High-speed performance

The model tracks as if it's a pattern ship. Its top speed with the O.S. .46 is approximately 60mph, with no sign of flutter or other control problems.

• Low-speed performance

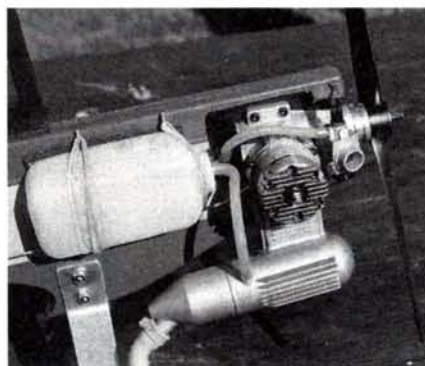
The Ultimate is able to slow quickly for touch-and-go's or landings. Keep the nose down, and control is positive right to touchdown. Hovering maneuvers are possible as long as the engine response is quick and strong. All surfaces are alive at slow speeds. Stalls are straight-ahead and predictable.

• Aerobatics

The full-scale Ultimate is designed for aerobatics. The Sig Ultimate is, too. Maneuvers from a loop to multiple snap rolls are easy to perform. Knife-edge flight and knife-edge loops are also in its bag of tricks. Inverted flight requires no elevator correction, and both high- and low-speed maneuvers are possible. Your thumbs are the only limit to the Ultimate's flight envelope. Control mixing and coupling allow a very tight flight pattern, and low altitude stunts add to the fun.

Assemble the wings and struts with the nylon socket head bolts. These bolts allow "breakaway" in the event of a bad landing or impact. Buy a spare set for future use if needed. Refer to the plans to verify that the wing and stab incidences are correct. I found it necessary to adjust the top-wing front-mount bolt hole at the center section for correct alignment.

I set up the Futaba* 8UAP radio system by following the included Control Travel



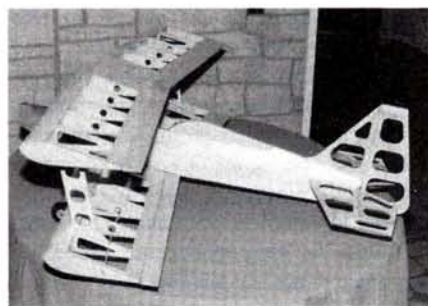
The simplicity of a profile fuselage is a perfect match with the fun-fly biplane. Landing gear, fuel tank and engine installation is as simple as it gets.

chart and Control Mixing chart. I used both the flaperon and elevator/flap mixing for maximum performance, but the plane can be flown without these features.

I completed the final balance check, and the Ultimate was ready for its first flight.

CONCLUSION

Sig has come up with some new ideas for profile aircraft. The Ultimate Biplane's removable wing allows easy transport of



The framed-up model ready to cover.

this fun-fly model. Laser cutting and fit have created an easy-to-build kit. This plane is the Ultimate fun-fly design of the future, and it is available now. Enjoy!

*Addresses are listed alphabetically in the Index of Manufacturers on page 131.

About the author

Dan Luchaco took part in his first fun-fly contest in 1971, and with his club, Valley R/C, he has become involved with competition flying and contest-format development. Dan is a past president of the National Competition Fun Fly Association (NCFFA) and regularly attends events in the U.S. and Canada. He lives in Sayre, PA, with his wife, Lou Ann, and his daughters, Amy and Melynda. His son, Steven, is a third-generation R/C'er and his toughest competition at contests.

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UNLIMITED 6TH ANNUAL RACE

Giant-scale battle for air superiority

by GERRY YARRISH

THE FORMULA is a simple one: get together a bunch of speed hounds, ask them to prove which one is the fastest, and then give them a place to do it. Who was the last man left standing? The answer came at the Madera Municipal Airport, Madera, CA. The 6th Annual Madera Giant-Scale Unlimited Race, held on September 25-29, was a perfect location for just such a high-speed shootout. With over \$10,000 in purse money up for grabs and 145 entries, the competition was intense.

MADERA STYLE

The Madera race is organized by Lesley Burnett and Nancy Bridi of Endless Horizons Inc. (EHI), and they have run Madera for the last five years. Dave Bridi, president of the Giant Scale Air Racing Association* (GSARA), is also the administrative assistant for EHI, and he works closely with Lesley and Nancy. Dave developed the pylon and light system for the race (in 1991, radios were used to signal when the racers could turn). Each of the pilots has a color that coin-



Clay Mihlfeld, no. 77, gets a green light at pylon no. 1 and brings his Rare Bear around without much room for someone to sneak by below.

cides with a colored light on the pylons. Being some 1,600 feet from pylons one and two, these lights are used to tell the pilot's caller when the plane has passed the pylon. The lights are controlled by turn callers who are part of the Madera staff.

Pace planes were used the first few years, but now a countdown clock is used to set the start. When all the planes for a heat are at the ready line, the signal is given to "crank 'em up." The racers then have 2 minutes to start their engines. Flightline control (Steve Parola) then signals each racer to take off. Once the last racer is up, the clock begins a 1-minute countdown. The racers fly around the pylons and try to time their crossing of the start/finish line exactly as the horn sounds the beginning of the race. If a racer flies past the start/finish line before the horn sounds, he is penalized 10 seconds. If the racer is more than halfway to pylon one as the horn sounds, he receives a 0 for the heat. Cutting a pylon (flying inside the course) brings a white light and a penalty. One cut is 10 seconds, the second cut another 10 seconds, and a third cut



PHOTOS BY GERRY YARRISH



Above: third-place winner Formula-One Gold: Ralph Braun, no. 68, of Braun Racing. The scratch-built GR-7 is powered by an A³ engine. Below: oops! Even the best stub their toes on landing, especially in the Biplane class. Bill Cunningham's Mong bipe wasn't damaged.



Third-place Unlimited Silver: Leonard Norred, no. 111, of Nelson/Pennzoli; Saxton Stiletto; Quadra-Aerrow 200.



John Eaton, no. 52, of Brownsboro Intl. Racing won fifth-place in the Biplane class with his 4.4ci, J&K powered, Horndog Knight Twister.



Above left: fourth Unlimited Gold: Dennis Crooks, no. 140, and the Menace racing crew; P-38 Lightning (based on Zirolli* plans); two 6.6ci Husky Challenger engines. (Left to right: Russ Stoltz, Jim Cristatos, Linda Crooks, Dennis Crooks and Bob Walker of Robart*.) Above right: Second-place Biplane went to John Lockwood, no. 616, of L&L Racing. He flew a KT Aviation Full Tilt Boogie Mong, powered by a Quadra-Aerrow Q-75.

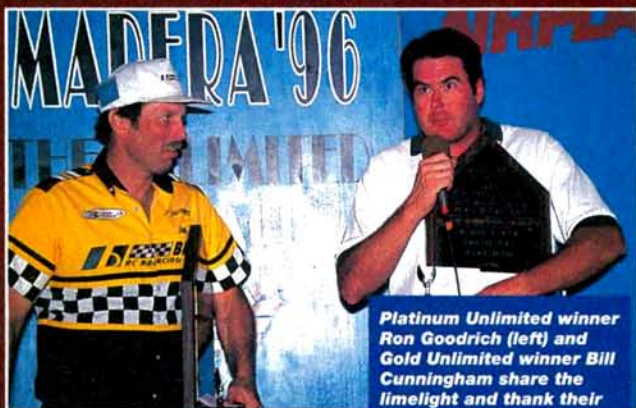


Mike Johnson of Johnson Ford Racing shows he's a little pleased with the performance of Tony Plebanek's fifth-place Unlimited Silver winning Rare Bear; 280cc Herbrandson*.



Second-place Gold Unlimited: Scott Manning, no. 222; Horndog Super Corsair; 280cc Herbrandson.

MADERA



Platinum Unlimited winner Ron Goodrich (left) and Gold Unlimited winner Bill Cunningham share the limelight and thank their sponsors and crews.

Precious Metals

Having two competitors in the winners' circle puts a new twist in the racing formula. But at Madera,



A³'s Bill Cunningham's won the Gold Unlimited with a Desert Aircraft® Vendetta.



The Braun Racing team gets ready for the start of the next heat. Ron Goodrich's all-wood Lancair was scratch-built by Wendell Hostetler.

to show that Platinum and Gold are created equal, Lesley Burnett had the two winners share the limelight. And two more deserving gentlemen couldn't have been picked. Ron Goodrich (Platinum) and Bill

Cunningham (Gold) shared the stage at the awards ceremony. Here's a look at each.

Ron Goodrich, Winamac, IN
Race No. 820, Braun Racing Team

Aircraft: Lancair
(scratch-built, wood)
from Wendell Hostetler's plans

Radio: Airtronics

Engine: 8.8ci A³

Propeller: RacePro

Retracts: Barton

Weight: 32 lb.

Time: 81.90

Speed: 190mph average

Bill Cunningham, Chouteau, OK
Race No. 888, A³ Unlimited Racing Team

Aircraft: Vendetta (Desert Aircraft kit),
foam wing and fiberglass fuselage
custom-built by Bob Aryes

Radio: Futaba

Engine: 290cc Herbrandson/A³ custom

Propeller: RacePro

Retracts: Robart

Weight: 41 lb.

Time: 84.81

Speed: 185mph

gives you a 0 for the heat. This is why a consistent caller is so important.

Madera (EHI) has started many of the classes now associated with Unlimited races. In 1991, Unlimited was the only class, and about 50 racers competed. In 1992, when EHI started to organize Madera, they introduced the AT-6 class to provide lower-cost racing where more people in the hobby could compete.

AT-6 still remains one of the most popular classes. In 1994, Madera introduced 42-percent-scale Formula One and, in 1995, the Biplane class took off.



First-place Formula-One Gold: Ken McBride, no. 671; Horndog® Nemesis; James George 4.2ci engine.



Check out the win tally on the side of no. 52—John Eaton's, Knight Twister; fifth-place biplane; 4.4ci J&K.



Third-place Platinum: AT-6 winner Scott Baker, no. 691, of Nelson/Pennzoil; RacePro kit.



ISC's Jim Goad Sr. adjusts the needle as Jimmy Goad Jr. holds on. Jim's Formula-One racer is, naturally, powered by a Zenoah 445 twin.

A CLASS ACT

Starting on Wednesday, the entrants set up their pit areas and headed for the registration area. The classes for the 1996 race were: Unlimited Gold and Silver, Unlimited Platinum (for Lancair models), Formula One Gold and Silver, AT-6 Gold and Silver, AT-6 Platinum (for advanced T-6 designs) and Biplane Gold and Silver. Following registration, each model headed

for Technical Inspection where models were measured and weighed to make sure they were legal for each class. Safety items were also checked, and then the models were tested at the run-up area to check the radio operation while the engines were running. With straight-line speeds of up to 240+mph and the size of these racers, nothing is overlooked; if it doesn't pass inspection, it doesn't race, period!

On Thursday, qualifying and heat racing began, and the racers were sorted out and placed into the race matrix. The matrix is the order in which the racers are grouped for heat racing, and it consists of a list of who competes in which heat. For Unlimited, each racer is given two chances to run two-lap qualifying heats, and their best single-lap time is used for their bracket position. For the rest of the classes, a modified qualifying system is used. Heat racing starts right away, and the first two heats for each class are used to determine each racer's matrix posi-



AT-6 Texans are powered by stock Zenoah® G-62s, so the action is always close and tight. Many close calls can really put on the pressure.

man standing, Mr. Speed, knows he has earned his title. Speed is not all that counts to finish first; first you have to finish, and this involves teamwork. It requires equipment that works all the time; engines that start and produce full power all the time; crews; callers; and pilots that start and fly a tight, precise course all the time. The name of the game is consistency.

STILL THREE TROPHIES

One unusual change this year was the introduction of a Platinum class in the Unlimited and the AT-6 classes. As is usual in racing, technological improvements soon come to light that simply dominate a class. It happens in all types of racing and often has the effect of limiting the num-

GSARA Grand National Champions

Class	Race no.	Pilot	Team
AT-6	771	David Presta	Nelson/Pennzoil
Formula One	117	Babe Caltibiano	Nelson/Pennzoil
Unlimited	9	Jay Replogle	Johnson Ford
The selection of the Grand National Champions is based on the accumulation of heat points, wins and race-season participation.			



tion. Points are awarded for first to fifth place (first place gets 5 points, second place gets 4 points, etc.) and, in case of a tie, the top speeds are used to decide the winner. Heat racing continued on Friday and Saturday, and there was a noon-time R/C airshow as well as an on-going trade fair for vendors. Bobby Wilson of Cactus Aviation* brought along his impressive 42-percent-scale Ultimate biplane, which was flown by Jeff Nickerson. Bill Hempell demonstrated Lanier RC's* giant-scale Extra 300, and Roger Grothier performed with Aero Dynamics'* giant-scale Raven. On Sunday, the remaining heat races were run, and the Trophy heats were held.

The top five aircraft compete in the Trophy heats. Two alternates in each class have a chance to compete in the Trophy race if any of the top five don't start on time. It's in the trophy race that the action gets tight and exciting as the pilots use their skills to take the advantage over others in the heat. When the dust clears, the last

ber of new entrants. To help equalize the heats and to encourage new blood, Madera reclassified the brackets.

Lancairs ran in the Platinum Unlimited class along with any other Unlimited racer who wanted to challenge these sleek competitors. Lancairs could not, however, race in any other class. That Platinum winner Ron Goodrich (race no. 820) posted a time of 81.90 with his Lancair and Unlimited Gold winner Bill Cunningham (race no. 888) posted a time of 84.81 with his Vendetta (a difference of only 2.91 seconds) shows that we're not talking about great differences between times.

What the Platinum class did for the Unlimited heats was to bring back the warbird look in Gold and Silver. Modified Bearcats, Mustangs, Corsairs, a Yak-11 and a P-38 Lightning mixed it up in many heats and brought back the style of Reno racing.

The Platinum AT-6 class was established mainly because of the

MADERA



During the noon-time show, Jeff Nickerson flew this impressive 42-percent-scale Cactus Aviation Ultimate biplane.

AT-6 class is intended for "technically advanced" Texans, and the class was dominated by RacePro* Texans. It's interesting to note, however, that T-6 Gold winner Jim Maroney (race no. 008), flying his Byron* T-6, posted a winning time of 116.02, while T-6



Mike Boso, no. 084, brings in his Bully 75cc-powered DCU* Nemesis after another Formula-One heat. Mike and the Classic Racing team are always pushing the limit and trying new things. This year, they added small vortex generators to the side of the fuselage.

1995 controversy of scale outline and streamlining changes that had developed in the old AT-6 class.

The new Platinum

and Mr. "Platinum" Goodrich both shared the winners' circle.

TEAM SPIRIT

It's a simple fact that if you don't have a team, you can't race at Madera (or any other race for that matter). The guy holding the transmitter is but one person in a required team effort. A race team is composed of the pilot and his support crew, which consists of a caller, an aircraft handler and the person who starts the engine. All have to do their jobs for the team to succeed. For the team to win, however, the task is up to the smaller team within the team—the caller and the pilot. Throughout the competition, you can see the

What Hinges?

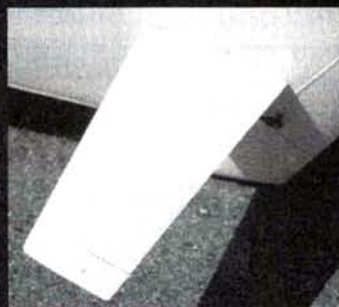
Looking at a few aircraft on the start line, you notice that something isn't quite right. It takes a little while to figure out because it doesn't register right away. Ah, that's it—the hinge lines, or more correctly, the lack thereof! Many of the composite race-plane designs are minimizing drag by streamlining the airframe. Owners of full-size race

aircraft use masking tape to cover gaps in the control hinges and even tape over rivets and Dzus fasteners. Every little bit adds up.

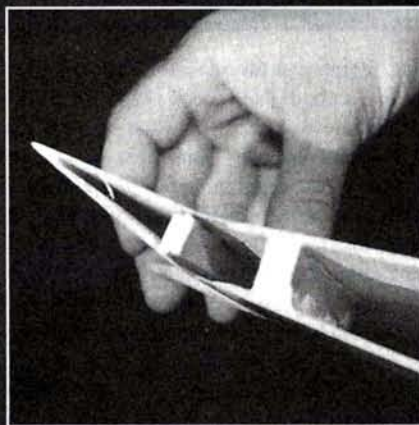
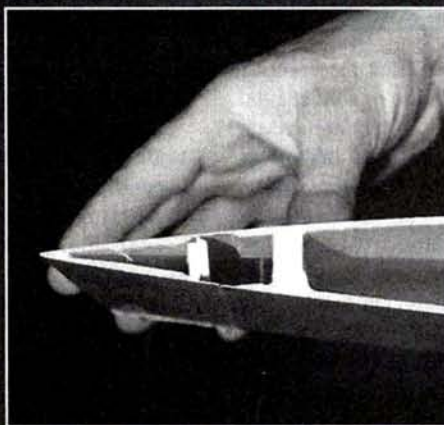
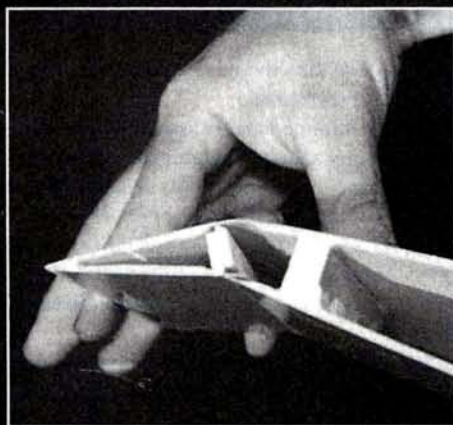
The use of "skin hinging" greatly reduces the drag normally present on conventionally hinged surfaces. By using the top (or side) skin of a composite-control surface as the hinge, you eliminate half

the drag. You also have the added bonus of a control surface that's completely sealed and, thus, more efficient, requiring less movement. This technique is possible only with molded, composite structures. Sweet setup!

T-6 racers take note: skin hinging is not legal for the Stock T-6 class.



Notice anything unusual? No hinge line! All that's visible is the elevator's outboard break line on this composite Formula-One racer. Ailerons and rudder use the same hinging technique.



Minimizing drag is one way to go faster. Hinge lines produce a fair amount of drag, and "skin hinging" eliminates most of it. Made possible by the use of vacuum-bagged composite construction, skin hinges are more than strong enough for giant-scale racing. Here, Bob Marine demonstrates skin hinging with a section of a RacePro AT-6 wing.

stress that the pilot and caller are under. Strategies change, grudge matches pop up and midairs do happen, adding to the adrenaline rush. Each competitor tries to intimidate, psych out, or simply scare the other racers while they all jockey for position. For the most part, you see a lot of serious competitors have a lot of serious fun. Professionalism is the operative word.

And speaking of teamwork, a number of successful teams brought home hard-earned hardware:

- Braun Racing captured fifth place in Unlimited Gold, first and fifth place in Unlimited Platinum, third place in Formula One Gold and second place in Formula One Silver.

• A³ Racing brought home first place in Unlimited Gold, second and third place in Unlimited Platinum and fourth place in Biplane.

• Nelson/Pennzoil Racing brought home a third in Unlimited Silver, a fifth in Formula One Gold, a second and third win in Platinum AT-6 and a fifth place win in Gold AT-6.

• The Blues Brothers Racing team earned fifth place in Unlimited Gold and first place in the Platinum AT-6 class.

• Dennis Crooks and the Menace Racing Team, flying a beautiful P-38 Lightning, placed fourth in Unlimited Gold, and Bob Smith of Bob Smith Industries Racing (his first time at an Unlimited race) brought home a fourth-place win in Unlimited Platinum. Bob didn't think much of his chances when he first arrived, but after the race, he said he would be back!

Unlimited racing is a team sport, and teamwork is what makes wins possible.

IN THE FUTURE

Madera continues to be the premier Unlimited race and has high hopes for the future of unlimited racing.



Flightline control, Steve Parola, plays race-traffic cop and makes sure that everyone gets into the air without getting hurt. Here, Kent McKenna's Yak-11 waits its turn to go.

Race-Class Parameters

During Technical Inspection, each race plane is scrutinized to make sure it's built to race-class specifications. Go-no-go gauges are used to measure widths and thicknesses. Planes are weighed, and engines are checked for displacement. Here are the race specs for each class:

AT-6

- Aircraft must be a scale representation of a two-place North American AT-6 Texan.
- 101-inch wingspan (1/5 scale).
- Stock Zenoah G-62 engine is required.
- Maximum weight—40 pounds; minimum weight—25 pounds.
- Fuel and propeller (22x10) provided by race officials.
- Price range: \$2,000 – \$3,000.
- Speed range: 90 – 120mph.

Biplane

- Scale representation of a biplane on the approved Madera (EHI) biplane list.
- Minimum wing area is 1,460 square inches (both wings combined).
- Aircraft must be proportioned to the scale of the wings.
- Root and tip thicknesses are 12 percent of the root and tip chord.
- 4.6ci engine maximum (engine may be modified).
- No tuned pipes allowed.
- Price range: \$2,500 – \$4,000.
- Speed range: 110 – 150mph.

Formula-One

- Must be a 42-percent-scale representation of a Formula One aircraft that qualified to race at Cleveland, the Reno National Air races, or the Phoenix 500.
- Wing thickness is determined by the root chord. Under 27 inches equals 13 percent at root and tip chord; more than 27 inches equals 10 percent at root and tip chord.
- Wheel pants required.
- 4.6ci engine maximum (may be modified).
- No tuned pipes allowed.
- Price range: \$2,500 – \$4,000.
- Speed range: 110 – 160mph.

Unlimited

- Must meet minimum measurements of GSARA specification sheets combined with parameters in rulebook.
- Maximum weight—55 pounds.
- Engine requirements: 14-pound maximum engine weight (single engine), 8 pounds per engine (twin engine), 9.6 pounds per inline engine (twin engine).
- Price range: \$3,000 – \$15,000.
- Speed range: 140 – 240+mph.

High-Speed Hardware

Here's a breakdown of the winning aircraft and hardware at Madera.

Unlimited

- 5 Lancair
- 4 Bearcat
- 2 Vendetta
- 1 Corsair
- 1 P-38 Lightning
- 1 Stiletto
- 1 Yak-11

Formula One

- 3 Nemesis
- 3 GR-7
- 1 Polecat
- 1 Cosmic Wind
- 1 Shoestring
- 1 Ole Tiger

Biplane

- 3 Mong
- 2 Knight Twister

AT-6 Texans (kits)

- 4 RacePro
- 4 DLD
- 2 Byron
- 2 Saxton
- 1 Yellow A/C
- 1 Zimprop
- 1 Horndog

Engines

- 11 A³
- 6 Quadra-Aerrow
- 5 Herbrandson
- 3 J-44
- 2 Husky Chall3nger
- 1 Zenoah 445 Twin (G-62 in all T-6s)
- 1 James George
- 1 3W

Radios

- 22 Futaba*
- 10 JR*
- 10 Airtronics*
- 1 Hitec*

Retracts

- 25 Robart
- 7 Barton*
- 1 Likes Line*

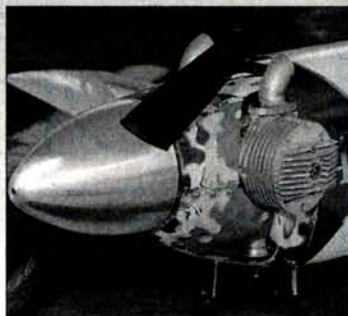
The technology developed for the races soon finds its way into mainstream R/C for the benefit of all. What could be next? Well, I heard a little bird say it would be really cool to have a T-28 race class. Hmmm! Anyway, it's a sure bet that Madera will continue to deliver the goods. Hope to see ya there.

The 7th Annual Madera Race will be held October 1-5, 1997, and it will be called the Madera Masters Invitational. There will

(text continued on page 60)



No. 888 heads off for another date with speed.



The noisy end of Bill's Vendetta. The twin-cylinder 290cc Herbrandson engine is a cooperative effort between Herbrandson and Bob Ayres of A³ Unlimited Racing. Awesome performer!

The Bill Cunningham Award

Bill Cunningham is no stranger to the world of giant-scale Unlimited racing. He has been racing giant scale since 1994 and winning numerous trophy spots. He was the Grand National Champion in 1994 and took a first-place win in the 1995 U.S. Aerobatic Masters. Bill has been a member of the U.S. aerobatic

team for four years and has been a Tournament of Champions (TOC) competitor six times, placing fifth at the '96 TOC in Las Vegas, NV.

At the '96 Madera race, Bill became the first recipient of an award named in his honor. The Bill Cunningham Award was created to honor exceptional achievement and to recognize the top R/C racing pilot in giant-scale racing worldwide. Bill won every Unlimited class Gold race in the 1996 season (four races) and, together with the A³ Unlimited Racing Team, Bill typifies the professionalism, dedication and sportsmanship that are the traits of true champions. Congratulations, Bill!

Between heats, Bill and crew tend to the wrenching of his Vendetta. Teamwork is so important in Unlimited racing.



Bill Cunningham, no. 888, works on his Vendetta before the start of the next Unlimited Gold heat. Bill received the Bill Cunningham Award for extraordinary excellence and performance. In 1996, Bill won all four Unlimited Gold.

A3 Unlimited Racing Team

Bob Ayres—
caller and team owner
(creator of the A³ engine)

Clarky Ayres—crew flightline support

Support crew

Bruce Kuharski, Ray Sledge,
Sam Hill, Cliff Magee



(text continued from page 57)

be four classes of racing: Unlimited, Formula One, Biplane and AT-6. EHI will be sending out approximately 200 invitations, and a part of each class will be reserved for new racers. There will be an entry fee, and all the invitations will be going out early in January 1997.

Racers can also apply for their invitations. For more information, contact Endless Horizons Inc., P.O. Box X, Torrance, CA 90507; (310) 320-8369; fax (310) 320-8354.

*Addresses are listed alphabetically in the Index of Manufacturers on page 131. ✦

New Blood at Madera

If the number of new racers registering at a race is any indication of whether or not the sport is growing, then Madera showed that the interest in racing is alive and well. Here's who raced for the first time at Madera. Hopefully, they will continue the speed tradition.

AT-6 Texan

- ★ Keith Keoppel
- ★ Dan Brunson
- ★ Ben Hinkle
- ★ Eric Schaapveld
- ★ Scott Baker
- ★ Wayne Bellmont

Biplane

- ★ David Newell
- ★ Brett Becker
- ★ Fred Sargent
- ★ Ross Shelton

Formula One

- ★ Ken Gregory
- ★ Mic Williams
- ★ Derwin Waters

Unlimited

- ★ Bob Smith

Youngest Racers

- ★ Brett Becker (16 years old)
- ★ Ben McBride (19 years old)
- ★ Suzanne Simpson (16 years old; called for her dad Greg Simpson)

Oldest Racer

- ★ Duke Crow from Old Crow Racing Team (67 years old)



A new face in Unlimited, Bob Smith of Bob Smith Industries flew in the Platinum class and earned a fourth-place win.



Before each AT-6 heat, the planes are fueled, weighed and given a race-legal APC* prop. Being a stock class, there's always a chance that someone will try to bend the rules for an advantage. The AT-6 system of checks and balances ensures that no one has an unfair advantage.

Madera Sponsors

\$3,500 and up
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Model Airplane News
PIC (Penn International Chemical)
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\$1,000 - \$2,500

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Hayes Products
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ISC International
Pacer Technology (ZAP)
Rahm Inc.
R/C Modeler
Robart

\$500 - \$1000

A³ Engines
Bob Smith Industries
Futaba
Herbrandson Engines
Horizon Hobby Distributors
Lanier RC
Model CAD
TruTurn Spinners



MODEL
AIRPLANE
NEWS

FIELD & BENCH REVIEW

by CRAIG TRACHTEN

*With a 73-inch
wingspan, it's
the biggest
Tiger yet!*



THUNDER TIGER Trainer 60 ARF



PHOTOS BY CRAIG TRACHTEN & WALTER SODAS

THUNDER TIGER'S* successful ARF Tiger Trainer series comes in .25, .40 and .60 sizes; I particularly like the .60 version because it's easy to see during flight and because it flies better in windy conditions. What's more, the size of its fuselage makes radio installation easy (especially for someone like me, who has big hands!). I bet you've heard the saying, "Bigger isn't always better." Well, in the case of the Thunder Tiger Trainer .60 ARF, bigger *is* better, and it's affordable, too.

CONSTRUCTION

- **Wing.** You'll have to epoxy together the three-piece dihedral brace/wing joiner before you can insert it into the wing. One big difference between this and other ARFs is that the brace's center piece is aluminum. To ensure a good bond, be sure that you roughen both sides of the aluminum. As always, I sanded the brace to make it a bit undersize; this allows it to fit easily into the wing halves and ensures that all the epoxy will not be squeezed out of the brace slot. Be careful to properly support the wing while the epoxy is drying. If the aileron binds, insert a piece of sandpaper between

it and the surface against which it's binding; then move the aileron up and down a few times. This will sand the end of the aileron surface and provide enough clearance.

- **Tail feathers.** The Tiger Trainer 60 has a plastic stab fairing; this is like your having an extra pair of hands. Besides adding to the aesthetics, the fairing keeps the stabilizers in place while the glue is drying. The horizontal stabilizer was perfectly level right out of the box. All control surfaces (including the ailerons) are attached with hinge-point-style hinges that must be epoxied into place.

- **Fuselage.** This is where you will really appreciate the size of the Tiger 60. You shouldn't have any problems when you install the radio gear, battery, fuel tank, or pushrods. If your hand and arm are small, you may be able to reach into this airplane up to the elbow. The fuel tank and radio gear are installed in the same fashion as in most ARFs. When you install the rudder-control rod, insert plastic tubing through the fairing toward the servo tray. Put the end of the control rod into the tubing, and pull back on the tubing while you

After I had arrived at the field, I broke out my preflight checklist. Our club, FLY R/C (Fairfield League of Yankee Radio Control), had printed a checklist similar

FLIGHT PERFORMANCE

to the ones that pilots of full-scale planes go through: engine secure, control rods tight, control surfaces move freely and in the correct direction, batteries fully charged. The Thunder Tiger .61 started right up. A minor needle-valve adjustment, and we were ready for taxiing.

• Takeoff and landing

Because the Tiger Trainer 60 has a "real plane" look, I went for a scale takeoff. I throttled up slowly and used approximately 150 feet of runway, then I input slight up-elevator. To compensate for torque, I was prepared



to input right rudder, but it wasn't needed. To my surprise, I didn't have to input any control until I wanted to level off. The airplane performed the climb-out "hands off." I must say that there was no wind—dead calm. For straight-and-level flight, at 1/2 throttle, I didn't have to touch my transmitter's trim controls. Landing was exactly what I had expected. The Tiger 60 comes in slow and stable. While on final, I just kept throttling down. When I was over the end of the runway, I brought the engine down to an idle, and the aircraft settled down as smooth as silk.

• Low-speed performance

With full up-elevator, the aircraft will almost fly at an idle. When it does stall, the nose dips with an almost unnoticeable break to the left. Give a little goose to the throttle and a 1/2-second blip of right rudder, and the aircraft is back to flying straight and level.

• High-speed performance

At full throttle, this plane screams. I was unable to get it into a high-speed stall. From level flight, I punched full throttle, gave up-elevator and went vertical. All the Tiger did was climb. After four attempts, I started to cut throttle during the climb. At about 1/2 throttle, it nosed over with a slight break to the left and proceeded to fly off straight and level.

• Aerobatics

Although a trainer isn't built for stunts, you can still have a lot of fun with this aircraft. It loops very well, and it will roll both left and right. Be prepared to input some down-elevator during the inverted portion of the roll. The Thunder Tiger .61 has plenty of power, and the model has enough elevator authority to sustain inverted flight for a while.

SPECIFICATIONS

Model: Tiger Trainer 60

Type: ARF trainer

Manufacturer: Thunder Tiger

Wingspan: 73 in.

Wing area: 915 sq. in. (6.354 sq. ft.)

Weight: 7 lb., 8 oz. (120 oz.)

Wing loading: 18.885 oz. per sq. ft.

Length: 58 in.

Engine req'd: .50 to .61 2-stroke

Engine used: Thunder Tiger GP .61 ABC/RC

Props: Master Airscrew 11x7 wood

Muffler: stock, supplied with engine

Radio req'd: 4-channel

Radio used: Futaba 7UAP Super 7

Fuel: Omega 15%

List price: \$219.99

Features: large wing makes for stable flight; ABS cowl and upper fuse give "real plane" appearance; all necessary construction hardware included.

Comments: the Tiger Trainer 60 is big enough to be readily seen during flight, yet it's small enough to transport easily—the best of both worlds! It's quick and easy to build.

Hits

- Easy build.
- Easy to see.
- Easy to fly.
- Reasonably priced.

Misses

- Aileron stock was slightly too long, and that caused slight binding with the plastic wingtip (easily fixed—see main article).

push in the control rod. The nose wheel is secured via a nose-wheel bearing attached to the bottom of the firewall. The main gear wire is one piece, chromed. Four metal straps secure the gear wire to the underside of the aircraft. Be sure to mount them on the plywood section of fuselage.

• **Engine.** I used a Thunder Tiger .61. I was impressed with its parts finish and with the way it performed on my break-in bench and in the air. It's mounted on the aircraft using the sup-

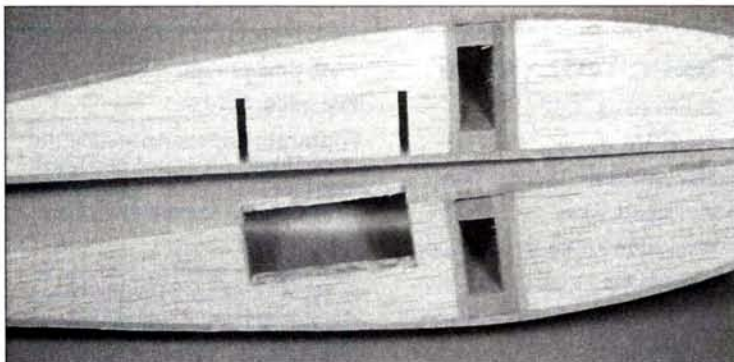
plied three-piece adjustable engine mount. The mounting holes have to be drilled in the mount arms, so take your time when you measure and mark. Don't forget that a cowl fits over the engine, so you'll want the proper thrust line and proper cowl fit. The pre-drilled throttle-control-rod hole worked fine.

• **Radio.** Don't be confused by the orientation of the servos in the building manual; it shows two different servo arms and orientations. This model has enough room for you to use your choice of arms facing front or back. Just be sure that the throttle servo faces right. Although this aircraft requires only a 4-channel radio, I installed my reliable Futaba* Super 7. I mounted the receiver against the bulkhead in front

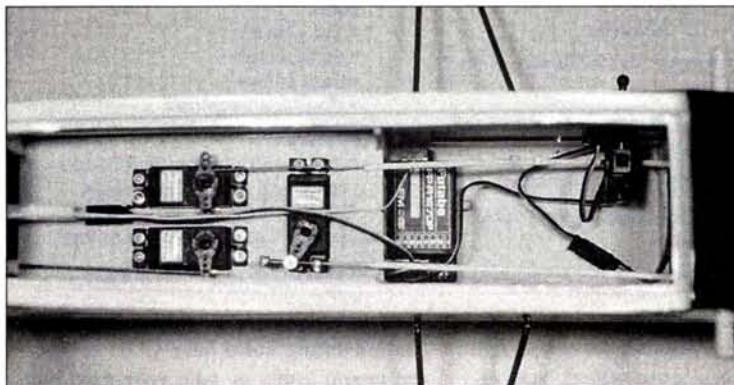


The Thunder Tiger .61 is mounted on the aircraft using the supplied three-piece adjustable engine mount.

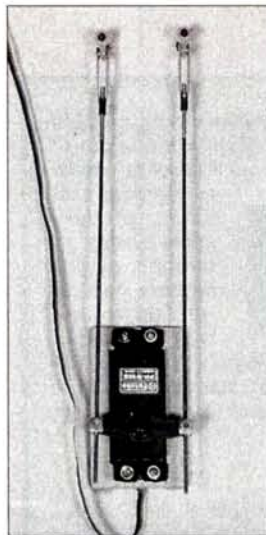
TRAINER 60 ARF



The root ribs require minimal work to complete the wing construction. Note that the servo well is defined by cuts made at the factory.



You shouldn't have any problems installing the radio gear, battery, fuel tank and pushrods in this roomy fuselage.



The push/pull aileron servo is center-mounted.

of the servo tray and installed the 4-cell flat-pack receiver battery just in front of the receiver. With this configuration, the airplane's balance is right on the money.

BUILDER'S THOUGHTS

When airborne, the Tiger 60 is easy to track, but it's not so big that it's difficult to transport. It's easy and quick to build, and, unlike other ARFs, its ABS plastic upper fuselage and cowl provide a scale appearance. Trainers don't get much better than this.

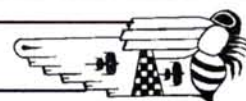
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About the author

Craig Trachten lives in New Milford, CT, and is the owner/operator of a HobbyTown U.S.A. there. He has been involved with model airplanes for nearly five years, and he aspires to be the "ARF King" of the local FLYRC club. Lately, Craig can be seen at the field with his Tiger Trainer 60 and with his son, Matt, who flies a .40-size version.



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Lazy Bee Special
40" wingspan
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The new aileron wing has polyhedral on the bottom only - it is straight across the top. This novel wing design is stable while flying upright - but unlike conventional polyhedral wings, it is *not* unstable when flying inverted. Construction and covering is easy.

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R/C FLOAT FLYING AT ITS BEST!

Sandy Point Fall Classic

by JERRY NELSON



Ted Russell's Canadian Canadair CL-215 is a model of a modern water bomber used for fighting forest fires. The aircraft picks up water by doing a touch-and-go on a lake or river; then it travels to the fire site and dumps the water. Ted's 1/8-scale model has a 3-quart water tank for simulated water drops and differential power control for water steering. Wingspan—122 in., length—88 in., weight—52 lb., two O.S.* 120 4-strokes; Graupner 14x7 3-blade props.

MY TRAVELS took me into the heart of eastern British Columbia, Canada, to the town of Salmon Arm, which is about eight hours north-east of Seattle, WA, on the Trans Canada Highway. The Grindrod Air Force, a local club, has hosted the Sandy Point Fall Classic there since 1981.

The beautiful wooded Sandy Point campground is about 5 miles west of town, and it was full of modelers in trailers, motor homes and tents. A couple hundred feet from the camping area is a 100-foot-wide, sandy beach that can easily hold several hundred aircraft. Modelers can wade out waist-high to about 25 feet from the water's edge—great for retrieving aircraft with dead engines! An out-board motor boat was always available for retrieving aircraft that didn't make it to the shore.

Many float aficionados came for the whole week, and one modeler even set up a workshop in his tent, which included a small band saw and a belt sander. He was building a new model. Many pilots brought their families.

Although it was hard to get an accurate count because the campground covered a large area, and it was difficult to see if aircraft had been stored inside tents, motor homes and trailers, I estimated that there were nearly 150 airplanes there—everything from a little .09-powered Lazy Bee, a tiny Ace electric Puddlemaster, Ugly Sticks and numerous 1/4- and 1/3-scale Cubs and Beavers to a giant 43-pound, four-engine transport.

Leorne Hansen's 1/4-scale Balsa USA* J-3 Cub looked just like "another yellow J-3 Cub" from a distance but, up close, you could see his magnificent attention to scale detail. He even had a homemade, hardwood, 1/4-scale canoe strapped to the floats. Leorne flew the Cub with the canoe and even had the door and window open all the time. Absolutely scale-like in the air; you couldn't tell if it was a model or a real Cub!



Perhaps my favorite aircraft, Charley Welkie's Kudahapen looks so realistic that it "could have happened"—thus the name. The model is Charley's idea of what a full-scale seaplane would have looked like if it had been built in the 1930s. The 16-pound model was powered by an Enya .90 4-stroke turning a 14x6 Master Airscrew* prop. Of special interest was the use of a Proctor* Antic biplane wing kit for the wings. The two fuselage booms were made of steel shelving channels.

ON THE WATER

Touch-and-go water takeoffs and landings are what float-planes are supposed to do, and that is what most fliers did. From my own experiences, there is a tremendous amount of pleasure in shooting water touch-and-go's. With unlimited runway length, you don't have to worry about getting down at the right point of the runway. Take as much room as you want. Every touch-and-go is enjoy-



Right: Len Vallie's Splash II is a single-hull design.

Len demonstrated many advanced aerobatic maneuvers, and the aircraft still had excellent vertical capabilities. His most spectacular maneuvers, however, were 100+mph, full-bore touch-and-go's. He puts in just enough down-tilt in his old Pro-Line radio to let the model settle ever so slightly, make a low pass and come down on its own. The landings look quite smooth, but at over 100mph, the landing loads must be quite high. Wingspan—72 in.; length—59 1/2 in.; weight—13 1/2 lb.; Webra* 80 with Magic Muffler.





PHOTOS BY JERRY NELSON

ment. There are few mishaps because of the "long runway" and no reason to force the aircraft down. Let it land in whatever direction it wants to go. If the engine quits, land anywhere you want.

Congratulations are in order for the Grindrod Air Force and its co-directors, Howie Cowan, George Hutchings, Loren Barber and Ted Russell. These guys have been doing a superb job for years; a water fun-fly can't get any better than this one. By all means, if you want to see R/C float flying at its best in a beautiful location and have a wonderful week or weekend of relaxed flying, then put the

Sandy Point Fall Classic in your schedule; it's always the weekend after Labor Day.

For more information on this year's Sandy Point Fall Classic, contact Howie Cowan, RR 31, Site 3, Comp. 11, Sorrento, BC, Canada V0E 2W0; (604) 675-4567.

*Addresses are listed alphabetically in the Index of Manufacturers on page 131. ✦

Ted Russell's 1/11-scale, 1933 Short Empire Class C, S-23 flying boat. A CK-3 directional control mixer allows differential engine power on the inboard engines to improve water taxiing. Ted has been flying the S-23 for several years and has more than 150 flights on it. Wingspan—120 in., length—90 in., weight—43 lb., 4 Enya® 80 4-strokes swinging Graupner® 12 1/2x7 3-blade props.



Above: Rich Cook did a great job of detailing this 99-inch-span Ikon N'west® Beaver. Rich took Ikon's sport-scale Beaver and made it into a Scale Masters-quality aircraft. Rich used the same paint (Imron) and colors that were used on the subject aircraft. SuperTigre® 3000; 18x10 prop; Ikon floats.



by ADRIAN PAGE

I PREFER the look of a model airplane without its muffler and engine hanging out in the breeze. This led me to look for aircraft with radial cowls; there's lots of room so the engine and the muffler can be fully enclosed. I also like the fast and colorful planes from the Golden Age of air racing, and the most famous of all—the Gee Bee R2—met all my requirements.

When I designed the prototype, it was only my third season flying R/C, so I wasn't sure of my ability to fly an exact replica. This would also be my first low-wing plane, so I decided to make my R2 a simple-to-build sport scale. The complex rudder is gone as are the elliptical wings and wing root fairings.

Because I wasn't sure whether my O.S.* .20FP could blow air past an 8-inch-diameter cowl, I reduced this dimension to 6¼ inches; the wingspan and overall length are about scale. Even with these changes, no one has mistaken it for a Piper Cub yet.

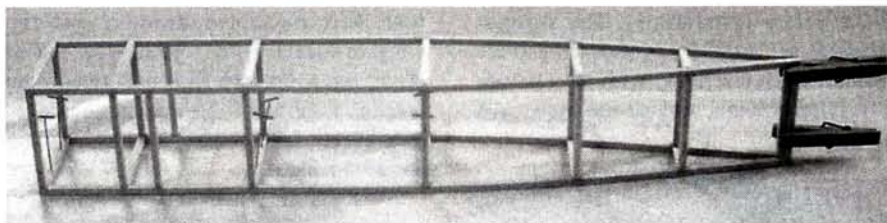
SPORT-SCALE *Gee Bee*



The Gee Bee is a striking aircraft in any size, and this one is sure to stir up conversation at the flying field.

A .20-size model R2

SPORT-SCALE GEE BEE



After the two side frames are built over the fuselage side view, they're joined together as shown over the top view. Make sure everything is square.

CONSTRUCTION

The plane has a simple constant-chord, D-tube wing and a stick-and-former fuselage. Anyone who has built a few kits should have no trouble with its construction. Remember: weight is the enemy, so choose your stock carefully.

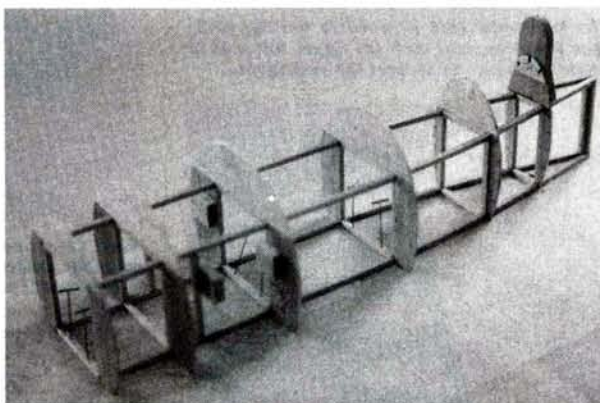
• **Wing.** The main part of the wing (excluding the tips) is 36 inches long, so you can cut 36-inch balsa sheets and sticks in half with no waste. All ribs are the same for simplicity. Make 16 of them, cutting four from medium-hard balsa for the landing-gear mounts. The rest should be quite light.

Cover one half of the wing plan with waxed paper; then pin a 1/4-inch-square shim over the spar location on the plan. Cover this shim with a strip of wax paper, pin down the trailing-edge sheeting, and glue the 1/4-inch trailing edge on top. Use the ribs to align the bottom spruce spar over the shim, and pin the spar in place. Leave the center rib loose, but glue the rest of the ribs to the trailing edge and bottom spar. Install the top spar and the 1/4-inch-square leading edge. Glue the wing-bolt blocks and top trailing-edge sheet into place.

Use a small square to set the center rib

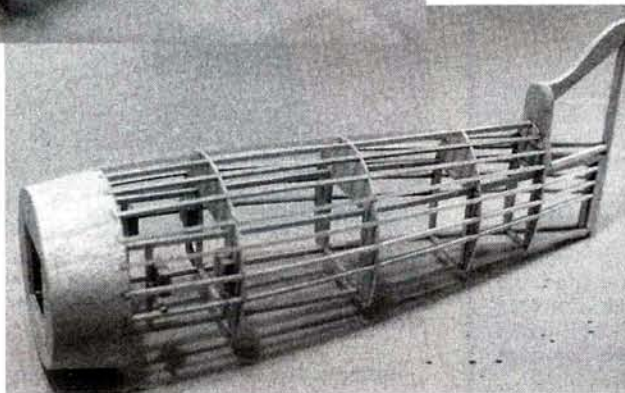
at the correct angle, remove the wing from the board, remove the shim, and block up the top 3/8 of an inch.

Install the 1/16-inch front bottom sheeting, and add the shear webs. Now you can glue the landing-gear mounting parts in place. Install the front dihedral brace by carefully cutting away part of the center



Above: here is the fuselage with the top and side formers attached. Note that the fuse framework is still pinned to the workbench.

Right: fuselage with stringers and nose-section sheeting in place—a light-weight but very strong structure.



rib. Pin the root rib down with the trailing edge touching the plan, and place a 3/16-inch shim under the tip of the trailing edge; now sheet the top of the wing. This will add the required washout. Build the other wing panel the same way.

SPECIFICATIONS

Model: Gee Bee .20

Type: sport scale

Wingspan: 41 1/2 in.

Wing area: 320 sq. in.

Wing loading: 21.6 oz./sq. ft.

Weight: 48 oz.

Engine req'd: .20 to .25 2-stroke

Comments: the Gee Bee .20 is a great looking sport-scale plane of a classic Golden Age racer. It uses traditional balsa and ply construction. The plane is stable in flight and yet is quite capable of any aerobatic maneuver you can imagine.

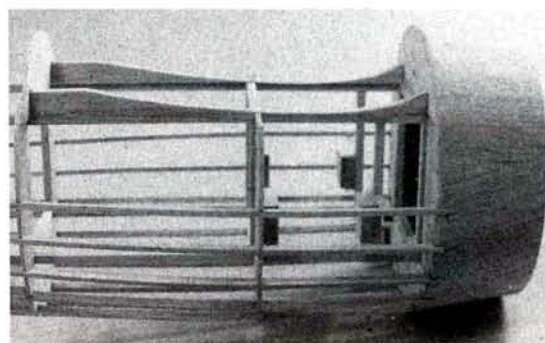
Once both wing panels are assembled, remove the area for the wing brace on the second wing panel's root rib. Join the two wings with 1 1/2 inch dihedral at one tip. Add the 3/32-inch sheet pieces for the servo opening, add the second plywood dihedral brace, and sheet the wing center section, top and bottom (mark the location of the wing-bolt blocks while you can still see them).

Block up the wing so that it's level, and block-sand the trailing edge square to the rib centerlines (this is an important step, so do it carefully). Finally, add the wingtips, aileron linkage, and sand the leading edge and trailing edge to shape.

• **Fuselage.** Build it accurately; it will save you a lot of grief later. Start by building two stick-frame sides over the plan. Use 3/16-inch-square spruce for the longerons and 3/16-inch-square balsa for the uprights. To ensure

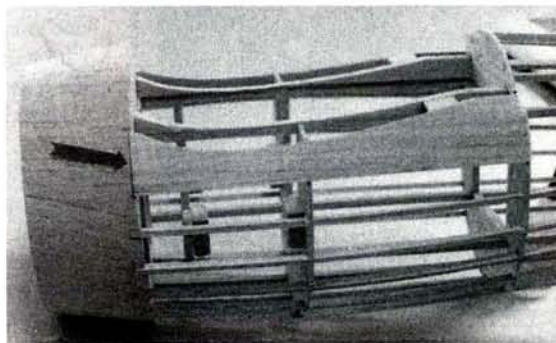
accuracy, I cut all 16 uprights at once on a tablesaw.

Join the sides over the plan. Cut out all of the formers using very light balsa. (Note: F-1B and F-2B are lite-ply. Make sure you drill the holes shown in F-1B and



Left: the 1/4-inch wing-saddle parts are glued to the bottom of the lower fuse longeron and are cut to fit up against former F-4. F-4 is positioned after the wing is placed in the saddle.

Right: here, the 1/16-inch-balsa wing-fairing sheeting is in place on the fuselage side. Note that its leading edge is mortised into the fuselage nose sheeting.



FLIGHT PERFORMANCE

• Takeoff and landing

Because of the short nose and the forward CG, you need full up while the plane taxis to the runway. The aircraft accelerates quickly; let the tail come up, then ease in some up-elevator. With a 10x3 APC prop, there is no torque roll on takeoff. Climb angle can be very steep if desired. Landing is done with the throttle to control the sink rate, which is considerable. If you go easy on the elevator and keep the nose level (grease it in), you'll be rewarded with a beautiful landing. Do not flare the landing, or you may belly flop.

• Low-speed performance

Well, it really won't stall; it just kind of mushes around with its nose up while it sinks at about a 45-degree angle. All the controls are functional in this configuration.

• High-speed performance

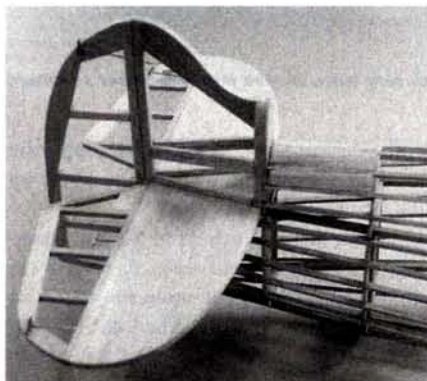
This is what Gee Bees do best! The rock-solid feel comes from the forward CG. I haven't noticed any unwanted behavior at speed; it goes where you point it. In fact, it flies very much like a friend's Extra 3.25.

• Aerobatics

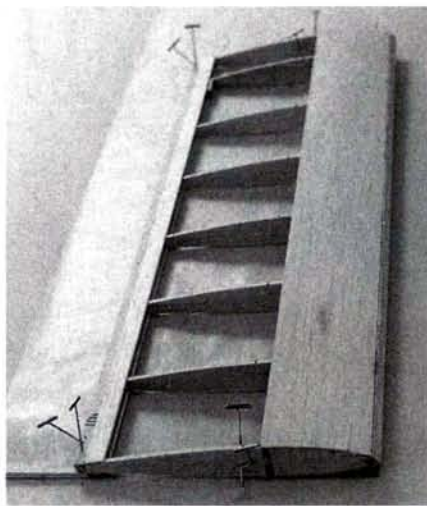
This was a surprise. It performs almost any maneuver in the book. Because the plane is so close-coupled and the elevator and rudder are large, it will do some wild snapping maneuvers. Rolls are axial, and inverted flight requires very little elevator correction. Knife-edge flight, huge inside and outside loops and inside and outside snap rolls are no problem. To recover from upright or inverted spins, just let go of the controls. The little Gee Bee does beautiful stall turns.



F-2B before installation). The stringer locations are marked with a pencil and are intended as guides only. With the fuselage still pinned down, add all the upper and side formers.



The horizontal stab is glued to the top fuselage longeron, and then the upper tail post is glued into place to support the vertical fin.



Washout is added to the wing panel by pinning the root rib to the bench and then blocking up the tip's trailing edge before the upper sheeting is glued into place.

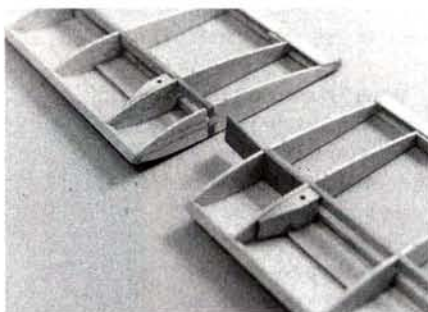
Remove the fuselage from the plan, and install the servo mounts now (use your servos as spacers, not the plans). Sheet the front end of the fuse back to F-2 with $\frac{1}{16}$ -inch balsa. Install the rudder post, R1, F-6A and F-6B. Now install the stringers. Pin the stringers into place one at a time. Make a cut on either side into the former to form the stringer slot in the former. This method gives a precise fit and a smooth flow to the stringer.

Install the $\frac{1}{4}$ -inch-thick wing saddle and lower formers along

with their associated stringers (use the wing to locate F-4B). With the wing in place, run a $\frac{3}{16}$ -inch drill bit through the holes in F-1B and F-2B and into the dihedral braces in the wing. Glue the wing dowel into place.

Now add the $\frac{1}{16}$ -inch, balsa wing-fairing pieces to the sides of the fuse, and mortise their leading edges into the fuselage nose sheeting. Install a flexible antenna tube. Glue the wing-mount blocks into place, and bolt down the wing. Now you can add the wing-root fairings to the wing's trailing edge.

Make a stab, rudder and a set of ailerons,

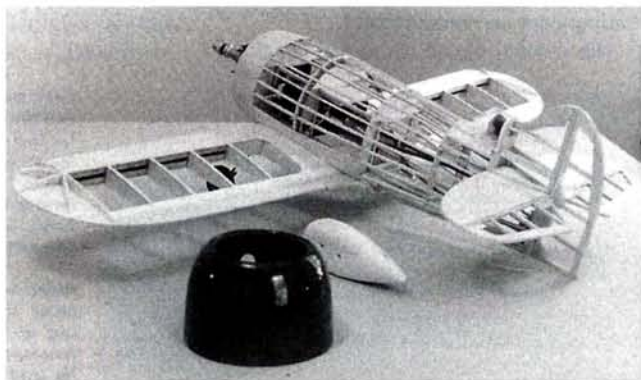


Here the wing panels (without the upper sheeting added) show how the dihedral brace is installed to join the wings. A slot is cut into each of the root ribs in front of the main spars to allow the brace to slide into place.

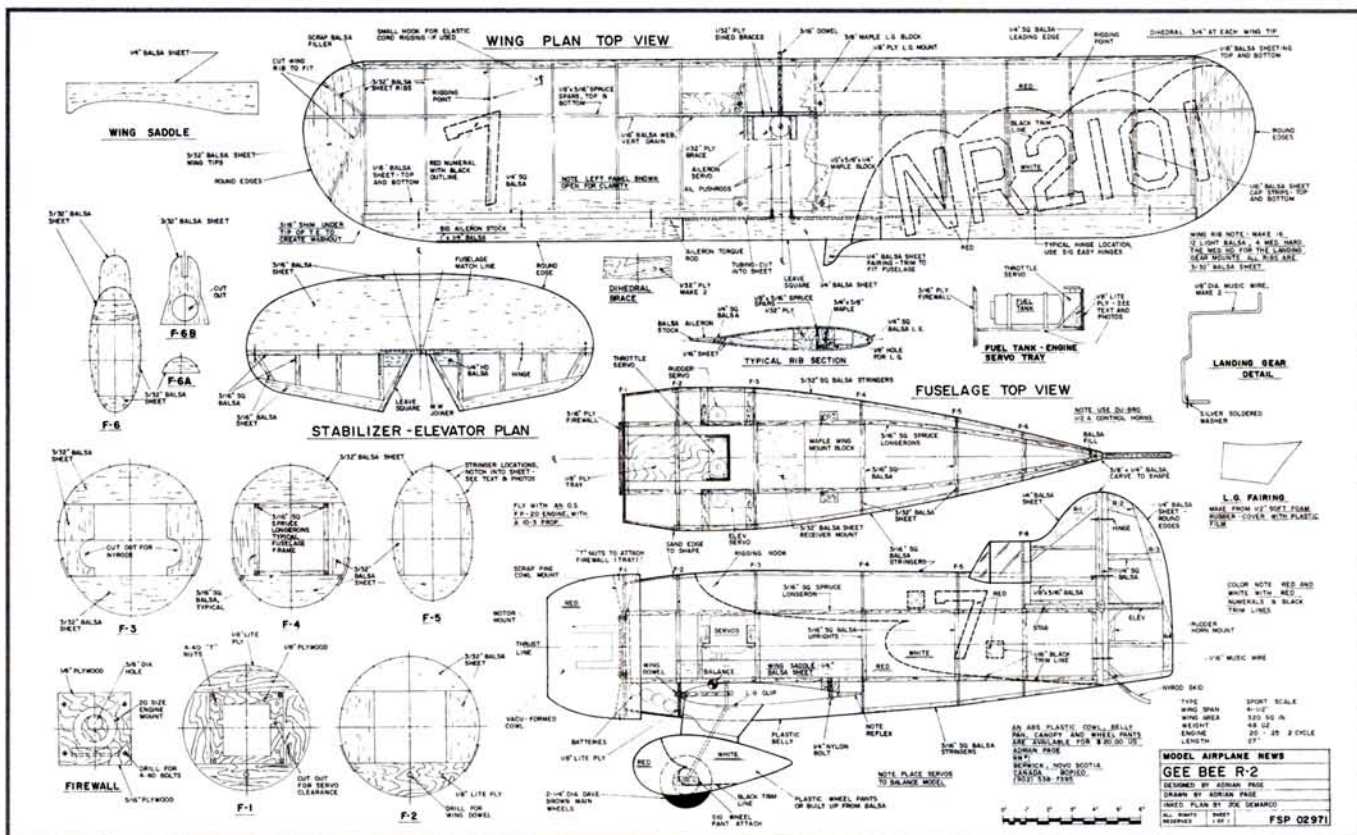
and hinge them all to the plane with Sig* easy hinges (do not glue yet). You are now ready to install the landing gear, tail skid, cowl-mounting blocks and whatever odds and ends I forgot to mention.

An ABS plastic cowl, belly pan, canopy and wheel pants are available from me for \$20. Ordering them will save you considerable work. It's a good idea to have these parts on hand to check their fit as you build.

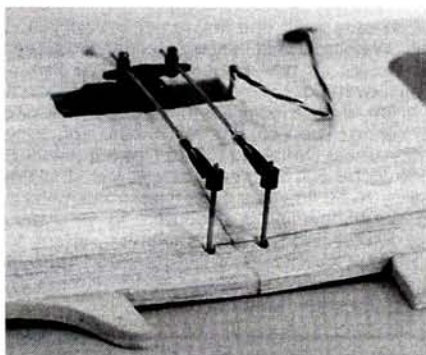
• **Engine.** The O.S. 20FP provides excellent performance; the plane is certainly not under-powered. However, a hot .25 should make it go straight up forever. In other words, a .40 is not a good idea! I mounted



The completed Gee Bee ready to cover.



TO ORDER THE FULL-SIZE PLANS (FSP02971), CALL 1-800-537-5827.



The aileron servo is mounted sideways with the output arms centered on the wing's center section. Note the wing fairing blocks added to the trailing edge.

the engine on a slide-out tray that also holds the fuel tank and throttle servo. The engine is side-mounted so that the exhaust exits out the bottom of the cowl.

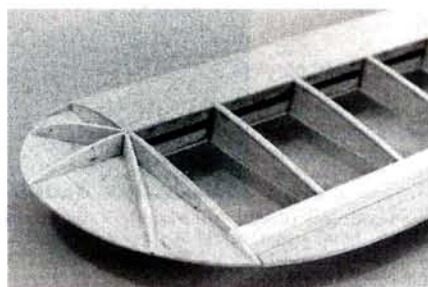
My muffler is made from 1/8-inch wall aluminum tube and plate, welded with a gas torch. The result is a very light and quiet muffler.

• **Radio installation.** I used a Hitec* Focus 4 FM radio with a Futaba RX and standard servos. Du-Bro* laser rods gave a solid rudder and elevator feel. Note that the pushrods cross over each other, which allows them to run almost straight. Control deflections are: elevator—7/8 inch

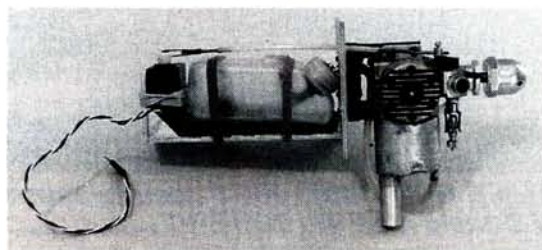
up and 7/8 inch down, ailerons—1/4 inch up and 1/4 inch down and rudder—all you can get.

• **Covering.** My plane is covered with Sig Supercoat film, which I found to be lighter and less difficult to apply than other coverings. To avoid bubbles, work carefully when applying the red trim. I used Sig's 1/16-inch trim tape to separate the red from the white. I used Coverite's* 21st Century paint on the cowl, belly pan and wheel pants.

• **Balancing.** You should add weight to the wingtip opposite the engine cylinder to balance the plane side to side. Then



Wingtip details show the center core sheeting and the stiffening ribs added to give the tip its form.



Here's the engine/tank support tray with hardware installed. Four screws secure the tray to the firewall.

balance the plane longitudinally according to the CG location shown on the plan.

I hope you ignore any doubting "experts" and the legend of certain and catastrophic failure because it really does fly very well, and *nothing* looks like a Gee Bee in flight.

*Addresses are listed alphabetically in the Index of Manufacturers on page 131.

About the author

Thirty-six-year-old Adrian Page has been involved with model airplanes since he was 8 years old. He especially likes sport-scale models of classic '30s racers and has designed several models. His favorite design is his profile Gee Bee. A resident of Nova Scotia, Canada, he lives 80 miles from the nearest hobby shop. To meet the needs of local modelers, he runs Adrian's Aircraft Supply—a hobby shop of sorts in a corner of his carpentry shop. Currently, he's president of the Apple Valley Flyers.



Great Planes Model Mfg.

F4U Corsair

**A .40-size
fun-scale
fighter**

by JIM McEWEN



THE CHANCE VOUGHT F4U Corsair is one of the outstanding aircraft of WW II and the post-war period. With its huge engine and propeller, it was the first American aircraft to exceed 400mph. Because of its unique inverted gull wing, the Corsair

is instantly recognizable, especially to those unlucky enough to see it headed their way with its guns firing.

Now you can join the ranks of famous

F4U drivers such as the VMF-214 "Black Sheep" and the VF-17 "Skull and Crossbones," courtesy of Great Planes* and its new Corsair kit.

CONSTRUCTION

• **Tail.** Precut 1/4-inch balsa pieces are edge-glued to produce the stab, fin, elevators and rudder, which feature scale aerodynamic balance tabs. The elevators must be drilled and slotted to accept a bent-wire joiner. A Robart* drill guide will simplify drilling by centering and aligning the drill bit.

• **Wing.** The Corsair's trademark inverted gull wing is something of a departure from the standard flat or dihedral wings. A 1/8-inch-thick die-cut lite-ply spar is epoxy-laminated between two die-cut 1/16-inch ply spars to form the center-section spar. The center section is built directly over the plans with a balsa-sheet jig supporting the rib trailing edge (TE). A die-cut dihedral gauge aligns the ribs. Use this gauge and the plans to align rib R-5 perpendicular to the spar and at the correct angle.

Attach the sheeting, the landing-gear blocks, and assemble the aileron-servo opening in the order specified in the manual. Because of the wing shape, some of the sheeting is tricky to cut, so take your time.

The outer-wing panels are of typical D-tube construction and are simple to build, with the panels initially built upside-down. Be sure to build a left and a right wing, and angle the T-1 inboard rib correctly to produce dihedral (not anhedral).

• **Joining the wing panels.** This is easy if you did a good job of aligning ribs R-5 and T-1. The center-section spar fits "tongue and groove" into the outer panels. A dowel glued near the TE aligns the panels. Apply a liberal coat of 30-minute epoxy to the mating surfaces, and slide the outer panel into place. Cut the ailerons 1/16 inch short to produce a small gap at the ends, and sand their forward edge to a V-shape.

The wing joints are not reinforced with fiberglass tape, but the kit designer assured me that the spar itself is sufficient to withstand the stress. This eliminates the pesky job of sanding and blending in the fiberglass tape and improves the finish of the model.

• **Aileron linkage.** A single aileron servo, mounted in the center of the wing, drives

pushrods through the downward section of the gullwing. The rods connect to 90-degree bellcranks at the points where the wing center section joins each of the outer panels. The arms of the bellcranks extend through cutouts in the bottom of the wing sheeting.

Nylon clevises are provided for the servo ends of the pushrods, but I suggest that you use Great Planes threaded steel clevises (no. GPMQ3790). These will enable you to easily remove the rods without removing the servo. Trial-fit the rod, unscrew it and slide it out from the bellcrank end. Solder on the bellcrank clevis. Re-insert the rod from the bellcrank end, align the threaded clevis, and screw in the rod.

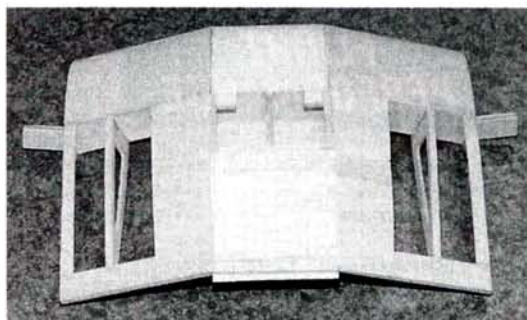
• **Fuselage.** The lower portion of the fuselage features flat sides and is built upside-down. The die-cut, interlocking pieces speed construction and help ensure a straight structure. The pushrods are 0.074-inch-diameter wire with slices of plastic inner pushrod pressed over it and spaced along its length; this is inserted into a plastic outer pushrod sleeve. The resulting pushrods are extremely strong and slop-free. For the best look, sand the outer pushrod sleeve flush with the fuselage side.

The rudder- and tailwheel-linkage rods are made of wire wrapped and soldered together. To keep the rods aligned during soldering, I used an alligator-clip vise. Because it's easier to shape the balsa blocks without the rudder rod in the way, I rearranged the building sequence and installed the linkage after the upper fuselage was built. I

delayed sheeting the fuselage bottom aft of F-8 until I installed the linkage.

Die-cut upper formers are glued over the lower fuselage. Square 3/16-inch stringers run between the formers. Install the ply instrument panel before you glue the left and right stringers to F-4B. This will make it easier to trial-fit and trim the instrument panel to the correct angle.

When you install the stab, be sure to file



Here's the top of wing center section after it has been sheeted but before the TE has been installed. Note the opening for the aileron servo.

a notch for the elevator-joiner wire, and install it before you glue the stab into the fuselage. To blend the wing into the fuselage bottom, the kit provides sheeting for a built-up belly fairing. I was concerned that engine exhaust and moisture might get into

SPECIFICATIONS

Model: F4U Corsair

Type: fun scale

Manufacturer: Great Planes

Wingspan: 56 in.

Wing area: 573 sq. in.

Weight: 5.5 to 6 lb.

Wing loading: 22 to 24 oz. per sq. ft.

Airfoil type: semisymmetrical with 2 degrees washout

Length: 43 in.

Engine req'd: .40 to .46 2-stroke or .48 to .70 4-stroke

Engine used: Thunder Tiger Pro .46 ABC

Prop used: Master Airscrew* 11x6

Radio req'd: 4-channel

List price: \$179.99

Features: interlocking die-cut balsa/ply with fully sheeted fuselage; built-up D-tube wing construction; vacuum-formed cowl and canopy; comprehensive, photo-illustrated instruction manual; complete hardware package; large decal sheets.

Comments: the model is structurally sound. The landing gear is capable of withstanding those hard bounces as you practice landing. The wing is very strong and withstood high-G pullouts.

Hits

- Ease of construction.
- Fiberglass reinforcement not required on wing joints.
- Detailed manual.

Misses

- Incomplete instructions for needle-valve and fuel-tank installation.
- Plastic engine cowl is weak.



This shows the tail-surface pieces glued together but before they've been shaped.

FLIGHT PERFORMANCE

Finally, we got nice weather over a weekend and were able to test-fly the plane. Neil Martin, a fellow club member and pattern flier, helped with the evaluation. The Corsair's inverted gull wing takes some getting used to and can lead to false orientation cues until you become familiar with its appearance.

• Takeoff and landing

The Corsair handles well during taxi in low-wind conditions. The recommended throws are more than sufficient for tight turns on the ground. Taxiing is more difficult in windy conditions as the plane has a lot of side area and will weathervane into the wind. To prevent a nose over, slowly advance the power, and hold a bit of up-elevator. The tail will come up quickly as the plane gathers speed. Because of engine torque, the nose will swing left, so be ready to apply a fair amount of right rudder. The TT.46 has ample power, and the takeoff run can be quite short with full power. Scale takeoffs with long ground runs can be easily accomplished at reduced power settings.

The plane has a lot of drag and will slow down quickly when you reduce the throttle. For the first couple of flights, start your final approach at a higher altitude. If you reduce power too much, the plane will slow down and drop. At low speed, the elevator authority is reduced, and, if the nose drops, you'll need a lot of up-elevator and time to get it up. Keep the power on until you've crossed the runway threshold. With practice, you'll find the right throttle setting to maintain during approach. Use throttle and elevator inputs to maintain angle of descent and sink rate.

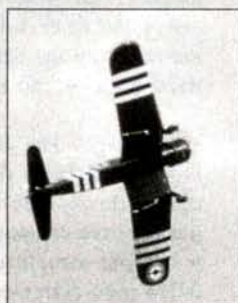
• High-speed performance

The Corsair handles very well at high speed and responds well to control inputs. I found the recommended elevator high rate to be too high (unless you like square loops). The recommended low

rate produces a comfortable response. The recommended aileron rates are too low; for low rate, use the recommended high rate. A few clicks of down-elevator are required to maintain pitch-trim in high-speed flight. The Corsair has a lot of drag, and there appears to be little speed change between $\frac{3}{4}$ - and full-throttle settings. The plane has a tendency to fishtail—particularly obvious at high speed.

• Low-speed performance

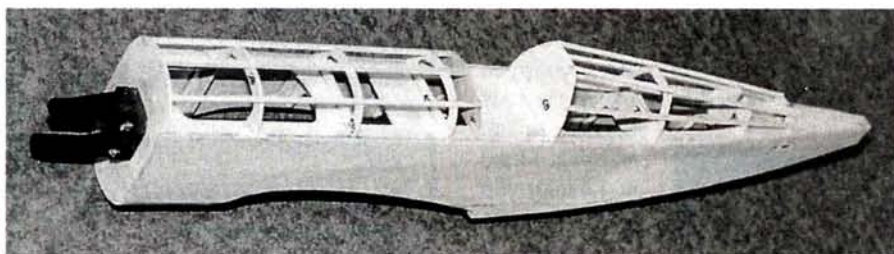
At very low speeds, control authority is reduced. Increases in throttle settings will produce considerable left yaw that can be corrected with right rudder. During stall tests, the throttle was slowly reduced and full up-elevator gradually added. The plane didn't stall, but it mushed forward and lost altitude with the wings level. I was very hesitant to try deadstick because of the high drag. If your engine quits, I suggest that you keep the nose down to maintain flying speed and head directly back to the field.



• Aerobatics

Although not intended as a pattern ship, the Corsair is capable of most maneuvers. Neil started to show off and did a rolling circle. Loops can be done at mid-throttle settings. Rolls aren't axial, but they aren't expected to be. During vertical maneuvers, you'll have to add right rudder to keep the nose straight as speed is lost. Knife-edge flight can be maintained, but the yaw-pitch coupling produces pitch-down when rudder is

added. Unless you correct with up-elevator, the Corsair will start a very nice knife-edge outside circle. Inverted flight can be maintained by holding a bit of down-elevator. A split-S followed by a high-speed strafing run will get your blood pumping.



The fuselage with top formers and stringers installed but before the top sheeting has been applied.

the fairing via the holes for the wing bolts, so I built a solid fairing out of block balsa.

Trim the two-piece engine cowl along the lines embossed in the vacuum-formed plastic sheet. I found that the front cowl ring was slightly oversize and didn't fit tightly over the rear cowl flap. When I glued the pieces together, I gathered the excess material to form a slight gap at the bottom of the cowl. This hides the misfit and also provides drainage for fuel residue.

The cowl, however, is too weak. Every flying session resulted in cracks that I repaired with CA and glass-cloth reinforcement.

• **Engine installation.** I installed a Thunder Tiger* Pro 46 ABC on the supplied adjustable engine mount. I had to

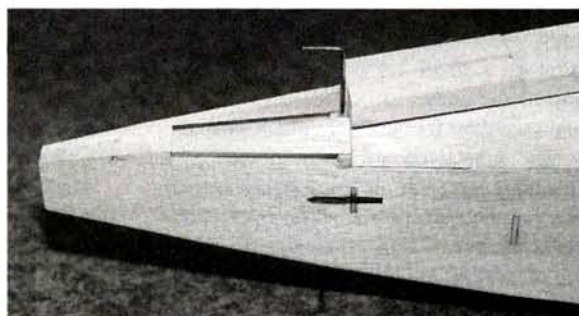
sand the side of the right beam to allow the engine to sit straight. I drilled and tapped the mount for 4-40 capscrews rather than using the supplied no. 6 machine screws. I used a Slimline* Pitts-style muffler.

With the engine installed $4\frac{15}{16}$ inches from the firewall, the needle valve lies at the cowl's molded front lip. I glued a plywood plate to the left side of the firewall to mount a remote needle valve and a Great Planes Easy Fueler. These are almost hidden by the cowl but can be accessed easily for fueling and adjustment.

COVERING AND FINISHING

I found a colorful scheme used by the French Navy in the Suez region. The markings, particularly the yellow stripes on the fuselage and wing, provide plenty of definition.

I used Hobbypoxy* clear to fuelproof the firewall, tank compartment and the area aft of the exhaust stacks. To improve the adhesion of the covering film, especially over the epoxy, I brushed a coat of Balsarite* over the entire model's surface. All covering, including the hand-cut markings, was done with MonoKote*. I also sprayed the cowl and canopy with

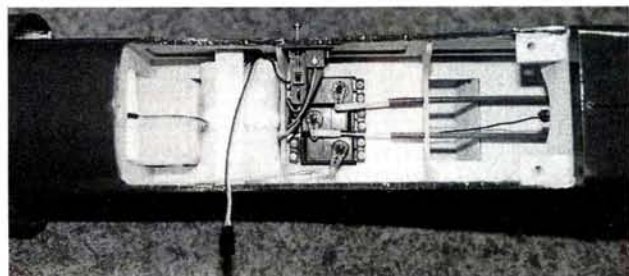


This three-quarter view from the right rear shows the addition of blocks around the horizontal stab before the stab top block has been installed.

Hobbypoxy paint. I installed a 2 1/2-inch Williams Bros.* pilot painted with Testors paints and applied the supplied instrument panel decal.

FINAL ASSEMBLY AND RADIO INSTALLATION

The kit includes CA hinges to attach the control surfaces. Be sure to drill the hinge slot to provide a tunnel for the CA to wick into the hinge surface. I modified Futaba* S148 servos using an LDM* ball-bearing



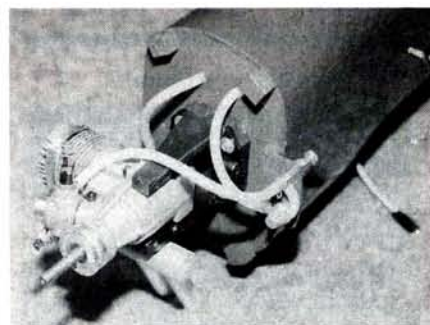
The foam-wrapped receiver is mounted forward of the servos and is held in place by balsa strip. The battery is below the fuel tank. The antenna exits the fuselage behind the wing saddle. A small piece of inner-pushrod tubing is used as the antenna exit guide.

conversion kit. The servos, SR Batteries* 700mAh receiver flat pack and JR* PCM receiver were positioned to balance the model on the CG with no additional weight. Control was provided by a Graupner/JR* MC-20 transmitter.

CONCLUSION

Overall, I'd have to say that the GP Corsair is an excellent kit and a good value. The combination of good design and a thorough instruction manual simplifies the construction and gets you into the air faster. The model looks great, both in the air and on the ground as it stands ready for its next sortie. I've received many compliments on it from fellow modelers, and that's important, isn't it? Although I wouldn't recommend the kit to a beginner,

it would make an excellent third aircraft for someone with some stick time on a trainer and a on mid-wing plane such as the GP Easy Sport .40 or something similar. The kit is also a great choice for any sport modeler who would like to fly a



Engine, muffler and fuel tubing installation. I glued a small plate to the firewall to mount a GP fueler and a remote needle valve. The mounting blocks for the cowl are glued to the firewall.

Corsair but who would prefer to do without the expense or complexity of a .60-size plane complete with retracts and flaps.

**Addresses are listed alphabetically in the Index of Manufacturers on page 131.*

About the author

Jim McEwen has been building and flying model planes for about 20 years. He has a master's degree in aerospace engineering and is employed as a hydraulics and structures design engineer. An avid ducted-fan enthusiast, he also enjoys sport-scale and aerobatic prop jobs. Jim, his understanding wife Anna, and daughters Karina and Laura live in Montreal.



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**For more
information,
see page 134.**

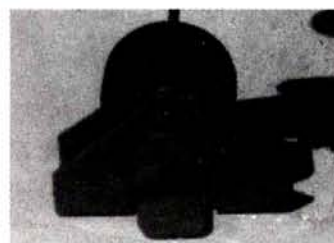
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by **ANDY LENNON**

IN THE 1930s, reasonable landing speeds dictated the wing's area and its loading. Wings were large in area, and loadings were low. The Piper Cub is



High-Lift Devices and Ground Effect

Flaps and their effects during landing

a classic example. Under stimulus of very competitive air races in that decade, designers discovered that much less wing area was needed for efficient, high-speed flight than was required for reasonable landing speeds. Wing areas were reduced, wing loadings went up, and landing speeds became dangerously high. The Gee Bee racers were typical examples. Many daring pilots lost their lives flying such aircraft.

It became obvious that some means of increasing the small wing's lifting capacity for slower, safer landings was sorely needed, so the split flap was introduced. One of the earliest designers to use them was Clayton Folkerts in his special racer (see photo and 3-view). This plane had 50 square feet of wing area and grossed 1,000 pounds for a wing loading of 20 pounds per square foot. Powered by an in-line, inverted, 4-cylinder Menasco engine of 185hp, its maximum speed was 240mph, yet its landing speed, flaps down, was a reasonable 67mph. Early WW II fighter aircraft, such as the Spitfire and Hurricane, incorporated split flaps.

Continuing research in high-lift devices led to the slotted flap, which provides more

lift and less drag than the split version. The P-51 Mustang had large slotted flaps of 14 percent of its wing area. Its gross takeoff wing loading was about 50 pounds per square foot (see Figure 3, Type 1).

The Fowler flap was the next high-lift device to be developed (see Figure 3, Type 2). This type provided more lift than the slotted version since it increased the wing's area substantially. It was first incorporated in the twin-engine Lockheed Lodestar that became the Hudson Bomber in WW II.

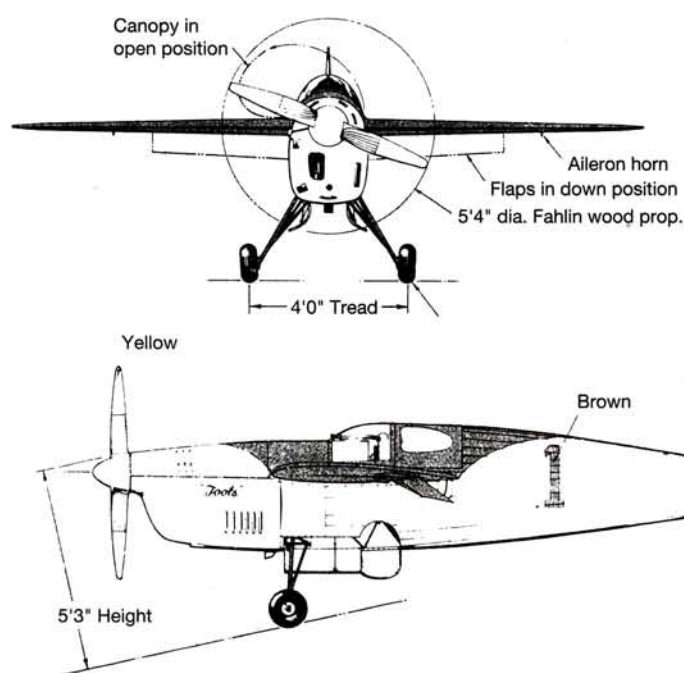
Many of today's sleek, fast composite aircraft utilized the NACA-developed slotted flap with extended lip (see Figure 3, Type 3), which bridges the gap between slotted and Fowler flaps. We have all watched a Boeing 747 in its landing posture in real life or on television. The number of high-lift devices on this plane's wings is startling: leading-edge Kruger flaps inboard; slots outboard; trailing-edge multiple slotted Fowler flaps, along with spoilers that rise to destroy lift on ground contact for graceful landings.

For model aircraft, slotted flaps result in smaller, faster and more maneuverable planes that have rugged construction, higher wing loadings and landing speeds of



The Folkert's Special was one of the earliest designs to use split flaps to increase the wing's lifting capacity for slower, safer landing speeds.

HIGH-LIFT DEVICES AND GROUND EFFECT



around 20mph. Higher wing loading permits drag-reducing features, such as ducted-engine cowls, landing-gear fairings, fully sheeted stressed-skin construction and the flaps themselves. All these features improve performance.

SLOTTED FLAPS IN ACTION

To this author, slotted flaps Types 1 and 3 are the optimum types for R/C models. They are easy to design and make, require only one servo for operation and virtually double the lifting capacity of the flapped area of the wing.

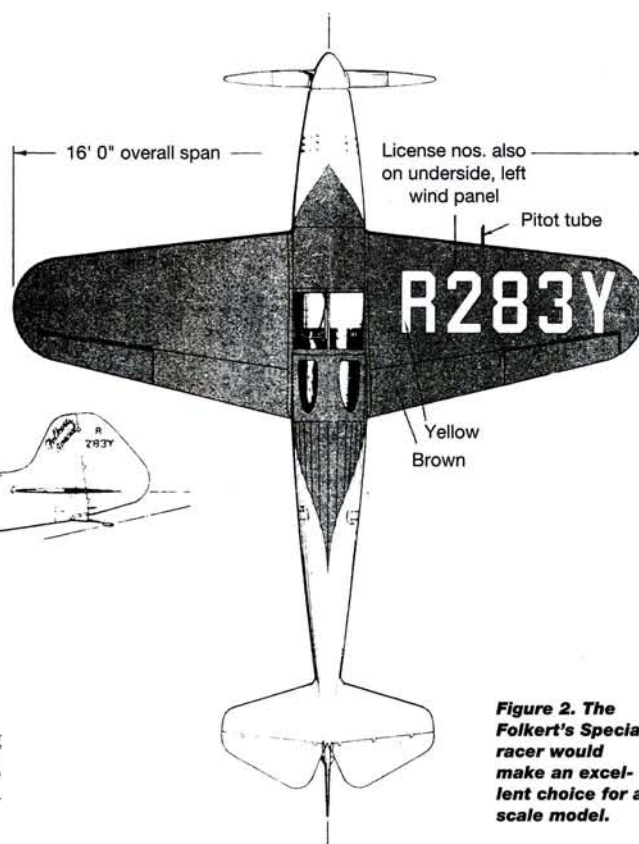
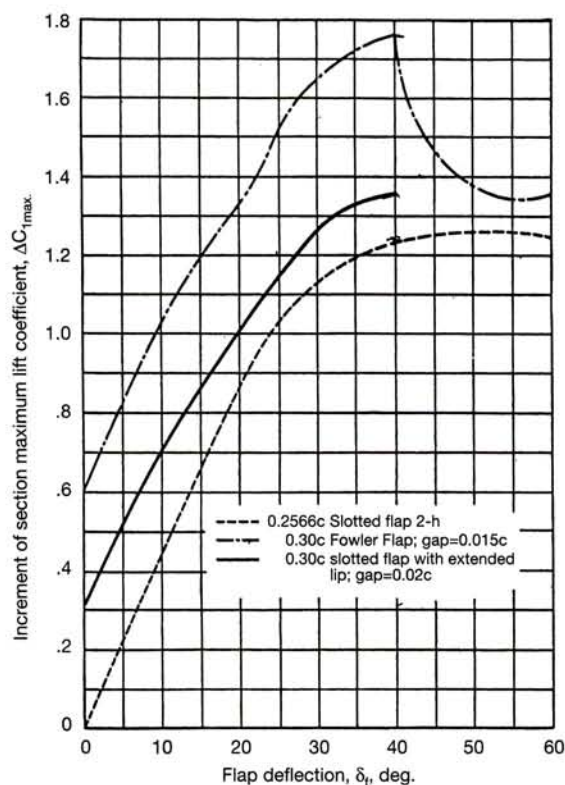


Figure 2. The Folkert's Special racer would make an excellent choice for a scale model.

Over the years, the author has designed, constructed and flown 10 flapped models, incorporating Type 1 flaps on six models, Type 3 flaps on three and the Fowler flap Type 2 on one—the Seahawk.

Lowering full flap, after throttling back causes many force changes:

- Lift increases substantially.
- The wing's center of lift (AC), normally at 25 percent of the mean aerodynamic chord (MAC), moves rearward a few percent of the MAC, producing a nose-down moment.
- A substantial increase in the airfoil's nose-down pitching moment occurs.

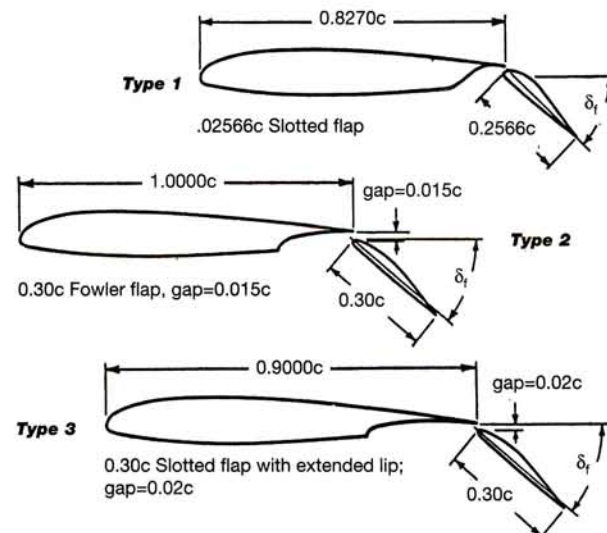


Figure 3. Comparison of increments of section maximum lift coefficient of three flaps on a NACA 23012 airfoil.

- Drag increases, causing a nose-up action on high-wing models; for low-wing models, the reverse applies. Mid- or shoulder-wing models that have a CG close to the wing are little affected. The drag increase slows the plane.
- The downward angle of the wing's downwash increases in proportion to the lift increase. This substantially increases the horizontal tail's download.

How these force changes balance out is interesting. For Type 1 flaps, the models all ballooned upward; their speed slowed, and they assumed a slow glide. This sudden upward zoom was disconcerting but was easily overcome by elevator down-trim applied simultaneously with flap lowering. Newer transmitters and receivers have electronic elevator/flap coupling that achieves this balance automatically.

Type 3 slotted flaps, of wider chord and with extended slot lips, require no trim adjustment. The models' attitude did not

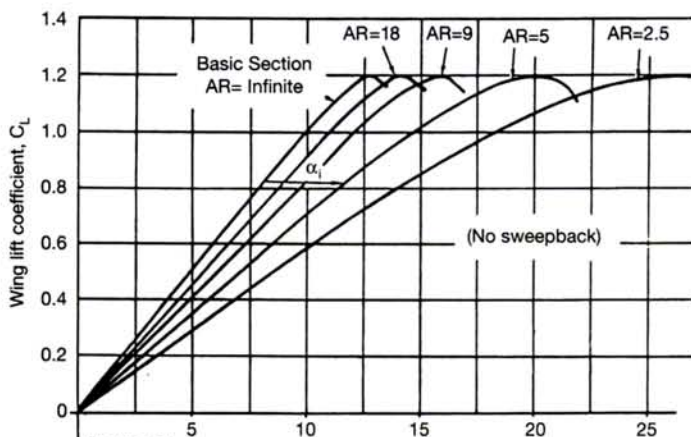


Figure 4A.

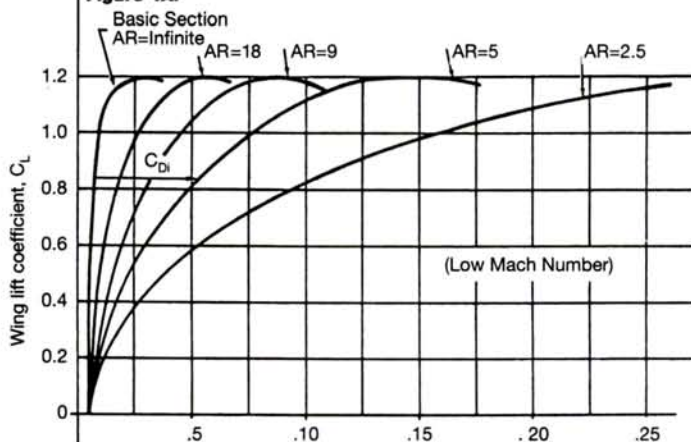


Figure 4B.

Effects of aspect ratio on wing characteristics.

change, but speed slowed very noticeably. The consistency of these two types of force resolutions is surprising.

On the one model with Type 2 Fowler flaps, the lowered flaps caused only a very slight nose-down action, probably owing to its low-wing design.

GROUND EFFECT

This important effect starts when the plane is its own wingspan above the ground and increases as the aircraft approaches ground level. It causes a variety of force changes:

- The wing behaves as though its aspect ratio had increased, causing an increase in lift coefficient (see Figure 4A), a large

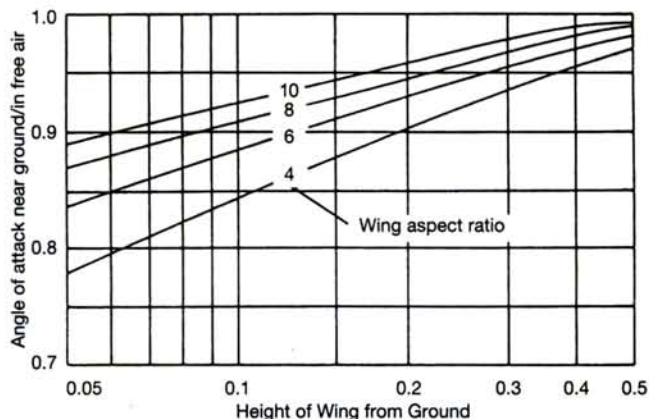


Figure 5. Comparison of increments of section maximum lift coefficient of three flaps on a NACA 23012 airfoil.

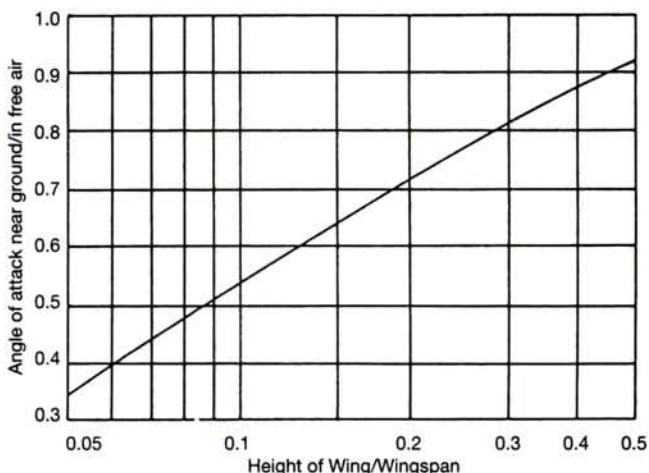


Figure 6. Impact of ground effect on the induced drag of a wing.

reduction in induced drag (see Figures 4B and 6) and a reduction in the wing's stalling angle (see Figure 5), which is important for landing-gear design.

- The downward angle of the downwash reduces significantly, reducing the tail download. This reduction is about half the downward angle in flight out of ground effect.

In this author's experience, the models' wing loadings have a major impact on their behavior in ground effect. Lightly loaded free-flight planes floated for surprising distances in ground effect.

Unflapped R/C models with wing loadings under 20 ounces per square foot of wing area seem little affected. Models with Type 1 slotted flaps and with wing loadings in the low 20s are similarly little affected.

Planes with Type 2 or 3 slotted flaps and higher wing loadings nose down gently and require moderate up-elevator action for good landings. The change in the downward angle of the wing's downwash in ground effect is the major factor.

A lightly loaded wing is operating at a low lift coefficient; its downwash angle is low. In ground effect, the reduction in downwash angle is small. The increased lift and reduced induced drag predominate, and the plane floats or is little affected.

The higher wing loadings coupled with the greater lift coefficient of slotted-flap Types 2 and 3 result in greater reductions in the tail download in ground effect. The model noses down and some up-elevator is needed to raise the model's nose for a gentle landing.

Try flaps on your next design. You'll enjoy their versatility. ✈

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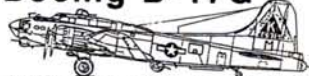
(Electric Flight), Paul Tradelius (Helicopters), and Don Typond (Finishing).

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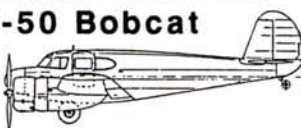
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Center **ON** LIFT

by MIKE LACHOWSKI

SLOPE COMBAT AND SOFTER LANDINGS

MANY POWER FLIERS think of soaring as a Gentle Lady floating around the sky. But for a glimpse of another version of soaring, they should visit a slope to see some real action—slope combat. I want to tell you about a few

lievably durable model.

Fortunately, some of the guys who operate “out of the basement” are using this technology to produce remarkably sturdy kits and models. One is Pat Bowman’s* Ruffneck, a conventional planform model with a 48-inch span, 10

our usual foam, but it can take a crushing without cracking and crumbling. Throw in some tail surfaces made with CoroPlast—a plastic sheet that looks like cardboard—and you have an unbe-

Dave Sanders at Dave’s Aircraft Works* used EPP and CoroPlast in a series of kits that look like WW II fighter aircraft. Now you can dogfight a “foaME109” with your “Foam51D.” These models also have a 48-inch span, with 10 to 11 ounces per square foot of wing loading and an S3016 airfoil. Many enthusiastic reports on the flying characteristics of both models have appeared on the R/C Soaring Exchange. [Editor’s note: to subscribe, send an email to soaring-request@airage.com; for the digest version, address the email to soaring-digest-request@airage.com.] The models fly in light lift, have good stall characteristics and withstand crash landings.

FLAP ANDAILERON MIXING FOR LANDING

Computer radios permit the use of a variety of options for setting control surfaces on landings. To slow a model on landing, the most effective surface is the flap. The important part in stopping a model is to get the flap deflection past 60 degrees. If you can get to 80 to 90 degrees, it will be even better.

But what do you do with the ailerons? When the ailerons are on individual servos, you have the option of moving them upward or downward for landing, or you can leave them neutral. Moving the ailerons upward gives you a configuration commonly called “crow” or “butterfly.” Up-aileron acts somewhat like a spoiler and further

new models that use special materials to make even more durable slope combat models. For the “slope impaired,” I have information on setting up four-servo wings for landing approaches. Finally, you’ll find a tip on how to remove the gunk that remains on wings when you have replaced those old tape hinges.

SLOPE COMBAT

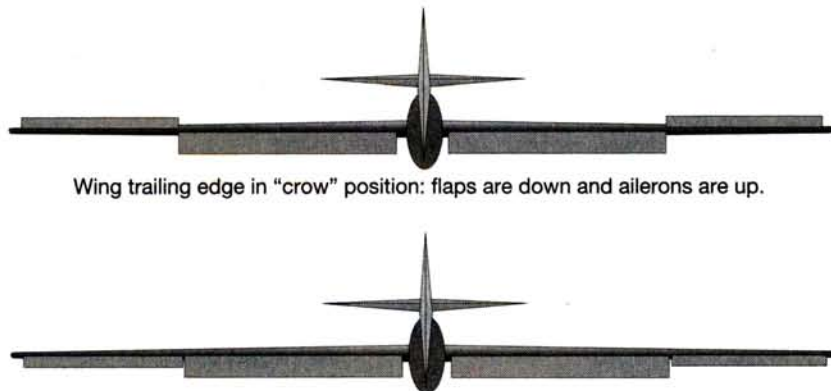
Although most pilots don’t want to crash their models, slope pilots often have little choice. Sometimes great slopes have no landing areas, so a landing is a controlled crash. The roughness of the environment led to the development of cheap, almost expendable models made of foam and packing tape and has prompted some pilots to develop a “Let’s fly combat!” mentality.

The next thing we knew, someone discovered expanded polypropylene foam (EPP). It’s more expensive than

to 11 ounces per square foot of wing loading, an E209 or RG-15 airfoil, EPP wing with a carbon spar, EPP fuselage and CoroPlast tail. (No more worries about crashes when you are trying to learn new aerobatic maneuvers; of course, you’ll always win in combat, so you won’t crash then.)



Dave Garwood's Foam51D from Dave's Aircraft Works patrolling the slopes.



Wing trailing edge in “crow” position: flaps are down and ailerons are up.

An alternative landing setup is to have the flaps down and the ailerons drooped slightly; this allows the model to fly more slowly.



Scale **TECHNIQUES**

by **GEORGE LEU**

WHAT'S NEW IN THE MARKETPLACE

THANKS TO ALL who have written with additional information and comments on some of the topics in my column. When the Scale Masters' Board adopted some of my suggestions for flight scoring (elimination of takeoff and landing as mandatory maneuvers for WW I-type aircraft), I was thrilled. I have recently been contacted by modelers wanting more information on the procedures for proposed rule changes for scale competition, in this case, to define the distance of flypast judging for WW I, WW II and jet aircraft. My suggestion is that they file their proposals according to AMA rules and regulations. I am glad this column may again make a contribution to scale modeling.

When I started to write my portion of "Scale Techniques," I suggested that scale modeling was a journey, not a destination. In keeping with that philosophy, I want you to understand that much of the information I provide concerns techniques for beginner, intermediate and advanced scale modelers who, if they desire, may become experts in the field.

LEARJET 35 CONVERSION

My good friend Mark Frankel, designer and originator of numerous giant-scale jet designs, passed along photos of Bill Prentice's efforts to modify his Learjet 35 into a Model 31A. Because the Model 31A is basically a Lear 35 with a longer wing-span and with wingtip "sails" in place of the tip tanks, the conversion is possible when you use the Model

Specialties* kit.

To stabilize the aircraft at high "alpha" (angle of attack), the Lear 31A fuselage has two additional delta fins at the tail. Combined with the larger wing area than the Model 35, this type of modification should make the Lear 31A a fantastic

grass-field twin-jet aircraft. I applaud Bill's effort to improve on Mark Frankel's excellent design.

SCALE MODEL RESEARCH

For years, Scale Model Research* has offered the world's largest collection of full-color aircraft documentation FOTO-PAAKS and 3-view drawings, and 1997 appears to

grown, so has this catalogue. Included in the 203-page 1997 issue are numerous articles by well-known scale modelers, along with advertisements, coupons and a well-organized aircraft-documentation system. For a copy of the 1997 edition, send \$8 (Canada/Mexico \$10, all other non-U.S., \$15) to Bob at Scale Model Research.

JB MODELS

The annual Rhinebeck, NY, Jamboree always brings back memories of my first love in R/C scale modeling—WW I aircraft. Alas, other than Ziroli, Proctor and VK designs, success when flying these vintage aircraft was never a common event. Because of design problems inherent in WW I aircraft (drag, CG location and narrow main-gear location, to name a few)

I slowly strayed to jet and WW II designs



Bill Prentice modified his Learjet into a Model 31A.

be no exception. I have used the services provided by owner Bob Banka for more than 15 years and find them to be of high quality. A scale modeler himself, Bob thoroughly understands what the scale model builder wants in the way of research. He also does almost all his own photography.

Several years ago, Bob began to offer his Scale Aircraft Documentation and Resource Guide, a comprehensive list of what he offers. As demand for Bob's services has

for scale competi-

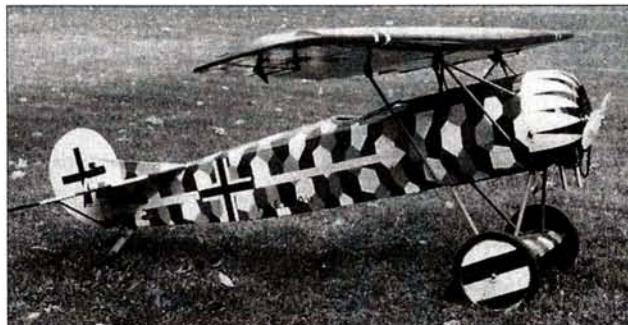
tion. Well, I may be headed back!

Jim Ryan-Barker (JB Models*) offers a line of kits that includes a Junkers CL-1, a Fokker DVII and a Fokker DVIII. The Junkers and the Fokker DVII are "stand-off" scale planes, but they fly exceptionally well, and, when airborne, look like exact-scale aircraft. The Fokker DVII has a 72-inch and the Junkers an 80-inch wingspan; both are IMAA-legal.

The Junkers and Fokker DVII aircraft feature flat-bottom airfoils to

enhance their flying characteristics. Jim has designed them with standard balsa and plywood construction; that's a wise decision for a "first" WW I aircraft model. Power them with a gas engine or a large glow engine.

The Fokker DVIII is a true 1/3-scale plane with an 111-inch wingspan and a



This JB Models Fokker DVIII is true 1/3 scale.

projected 28-pound flying weight—definitely huge. I suggest that you get the plans before you commit to a project of this magnitude. To ease field setup, the wing is a 3-piece design with a lite-ply center section and sheeted-foam outer panels.

Jim offers his designs as complete kits, partial kits, or plan sets. He has fiberglass and ABS cowl and panels for his designs and prebent cabane struts and landing gear. (The big DVIII uses aircraft tubing for all its struts, just like the real one.) For information on his line of kits, call Jim after 6 p.m. or send him an SASE.



Sanding drums are absolute necessities in the shop.

SANDING DRUMS

Jim Wilkinson of Panama City, FL, has been an active scale modeler campaigning an original-design, 90-inch-wingspan Stuka Ju 87B at many regional and national events. Jim and I met at Top Gun a number of years ago and immediately developed a friendship. We pass information to each other if we think it would be helpful, and recently, Jim sent me information on some drum sanders and sleeves that he and I

would like to share with you.

The information is from the McMaster-Carr Supply Co.* in Atlanta, GA. Page 1940 of their catalogue no. 97 shows versatile assortments of popular sizes of rubber drums and aluminum-oxide sleeves in a variety of grits. The 15-piece utility assortment at \$12 or the 15-piece Mini Drum Assortment at \$5 would make an ideal investment for your workshop.

When installed on my Dremel*, I use them for opening holes in balsa or plywood, for shaping fillets, to remove excess wood from bulkheads installed in a fuselage and on and on. When installed in my drill press, I use them to help me clean up and fine-sand ribs and formers, make lightening holes in bulkheads and numerous other functions. They are the type of tool you may not have a need for today, but if you have them in your shop, I guarantee you will find a use for them.

R/C KITS B-17

The B-17 *Flying Fortress* is revered by many WW II historians and by those who flew it as the aircraft that won the war. Since the release of the movie "Memphis Belle" a few years ago, the B-17 has been featured in numerous airshows, fly-ins and memorials. Modelers have written me for information on how to get a "big" B-17 kit. I couldn't help them until now.

Bob Campbell of R/C Kits* designed a 17-foot version about four years ago and had great success campaigning it on the giant-scale circuit. Bob's B-17 flew very

impressively, yet, because of its size, he didn't plan to make a kit or plans set available. Well, the demand has been so great that Bob now offers a plans set and kit of this giant B-17 in 1/7 scale.

It is designed around four G-38 gas engines (or equivalent) and employs foam sheeted with balsa for basic construction. Foam has good vibration-damping ability; and because foam is easy to contour and shape, you'll more quickly be able to apply the surface balsa; this speeds the building



This 1/7-scale B-17 from R/C Kits, built by Matt Miller, is an eye-ful. It weighs 95 pounds and is powered by four Zenoah G-38s.

process. Electric retracts, aluminum covering and plastic canopy parts are all available though R/C Kits.

I have enclosed a picture of Matt Miller's 95-pound B-17 taken at the Greenville, SC, IMAA Fly-In last summer. Matt did a nice job on his version of *Sentimental Journey*, powered by four Zenoah G-38 engines. When it flies, this plane is a showstopper. Does any other reader want to build a big B-17?

Well, that wraps up this month. I'll talk to you soon.

*Addresses are listed alphabetically in the Index of Manufacturers on page 131.

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CONSTRUCTION

Opening the box reveals white foam-cores (with a tapered planform and a modified 7037 airfoil), a blueprint plan, machine-cut parts, sheets and sticks, 2-ounce glass cloth, various small parts and a building manual with essential line drawings. The fuse sides are identical, and the 1/32-inch sheeting is the very best I've ever seen.

Start with the wing. When you remove the last 1/2 inch of the trailing edge, just leave the panel in the foam bed and use a 1/2-inch-wide strip as a guide to lightly cut only the wing-core. The manual says you should use epoxy to sheet the cores, but my friend Pete Young put me on to what I think is a better way: dilute yel-

FOR 20 YEARS, I've been sorely disappointed by many of what I thought were the best of the electric-powered options being offered.

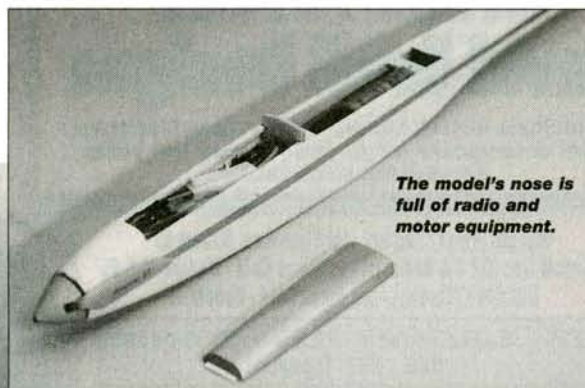
K&A UNLIMITED

by JIM SIMPSON

Voyager

A few years ago, they were too heavy, too expensive and not powerful enough. I'm 60 this year, I've done hundreds of reviews, and only occasionally have I come across *really* exciting subjects. This is one of them.

What follows is my experience with the K&A Unlimited* Voyager. It's powered by a 6V Speed 400 motor running on a 6-cell, 1000mAh battery and uses a 6x3 or 6x3 1/2 folding prop. My plane weighs 24 ounces at launch, and with a 60-inch polyhedral wing, it will thermal with the best of them. It also loops, spins, flies inverted and rolls. I've discovered that I can climb for 1 minute, then



The model's nose is
full of radio and
motor equipment.



Jim hand-launches his Voyager in a city park.

PHOTOS BY JIM SIMPSON

low carpenters' glue with drugstore alcohol to the consistency of salad dressing, then sponge it on the foam only (work quickly and use epoxy on the last 1/2 inch of the trailing edge), then stack it all up with weights on top. The next day, you'll have the neatest, toughest, lightest foam wing you've ever owned. All the wings I've sheeted this way weigh between 4 and 4 1/4 ounces.

The main trick with the fuselage is getting the motor to fit. Just take your time, measure twice, cut once, trial-fit every piece and make sure that the spinner will fair in smoothly with the fuselage. If you use 1/32-inch music wire as pushrods, you might want to go to the trouble of crossing the tubes at the rear of the fuse. I now use the small Sullivan* cable so that I can glue the tube to the body side without crossing tubes. You choose.

The tail is standard; it's built up with sticks and tricky to taper as shown on the plans, but it *can* be done. Just remember that it is delicate. I didn't build the rudder/fin with a bent hinge line because in '74, I learned that straight, slightly swept, sealed hinge lines are definitely superior.

Again, you are free to choose. Also, when I got tired of repairing the rudder every time a hot landing resulted in a slide or ground loop, I added a small, triangular, plywood tailskid.

FINISH AND FINAL ASSEMBLY

I MonoKoted* the fuselage and tail, sprayed one light coat of Coverite's* Black Baron flat clear on the wing and lightly sanded it when dry. After the first flying session, I sprayed four big black blotches on the bottom of the wing for contrast because the plane climbed so fast that it was nearly out of sight every time I flew it. The black "polka dots" sure help.

I added the 1/32-inch ply control horns after covering and before gluing the tail group on (I did this with the wing bolted in place so that they would all "almost" line up properly—sigh!).

I double sticky-taped the servos in place, connected them up and stuffed the controller, receiver and switch in the only way they would fit. Balance was close enough, so it was time to go to the field.

According to the plans, a filler piece should be used to fair the wing leading edge into the bulkhead, but I omitted that part so that I could drill a small hole in the bulkhead and use a straight pin to hold the hatch in place.

AT THE FIELD

I installed the battery and bolted on the wing; this was just too easy! Turn the motor on and pitch it. Test glide was perfect. Go pick it up, shove the throttle stick forward, pitch it again. Wow, does that

SPECIFICATIONS

Model: Voyager
Type: thermal electric flier
Manufacturer: K&A Models Unlimited
Wingspan: 60 in.
Wing area: 370 sq. in.
Weight: 20 to 26 oz. (24 oz. as tested)
Wing loading: 9 oz. per sq. ft.
Airfoil type: SD 7037
Length: 35 in.
Power req'd: Speed 400 electric motor
Prop: Graupner* 6x3 folder
Radio req'd: 3-channel (rudder, elevator, motor)
Price: \$39.95, \$69.99 (fiberglass version)

Features: white foam-cores with a tapered planform and a modified 7037 airfoil, a blueprint plan, machine-cut parts, sheets and sticks, 2-ounce glass cloth, various small parts and a building manual with essential line drawings.

Comments: how much do I like the Voyager? I have seven now and hope to always have a couple handy. This is where "E-power" is at!

Hits

- Good-looking sailplane-type airplane.
- Truly lightweight.
- Incredibly economical.
- More fun than you can imagine.

Misses

- No tailskid to protect rudder from landing damage.

baby climb! Before I knew it, the model was way up there, so I pulled the throttle stick to idle (prop stopped in fold position) and soared, and soared and soared. I repeated the drill twice more, then I started to do aerobatics.

This amazing little plane has great performance for a great price; and it's a lot of fun!

*Addresses are listed alphabetically in the Index of Manufacturers on page 131.

• Takeoff and landing

Takeoffs are simply a matter of turning the motor on and hand-launching into the wind. This plane is quick to accelerate, and you should pull the nose up a little at a time until the climb slows, but not so much that you

FLIGHT PERFORMANCE



lose directional control. Landings are very easy and are usually done by turning the motor off and flying a normal landing pattern. This plane is very aerodynamically clean and fast, but you can slow it down by easing in up-elevator command. I have yet to stall it and have learned to slow it enough before touchdown so that it slides to a stop smoothly without turning or ground looping. The name of the game is to slide her in smoothly (like an airliner), and do not stab the earth (like a competition sailplane).

• Low-speed performance

For the sake of this discussion, let us assume low speed simply means motor off and prop folded. Notice the wing loading is only 9 ounces per square foot. Chances are that you don't have and don't know anyone who has a plane so lightly loaded. But if you do, you can get a feel for its low-speed performance. For the rest of you, it is awesome—like no electric you've ever seen. That is one of the main reasons this is a winner.

Not only will this little plane stall crisply, but it will also spin (really) and snap-roll. And when you look at it, you think it's a sailplane.

• High-speed performance

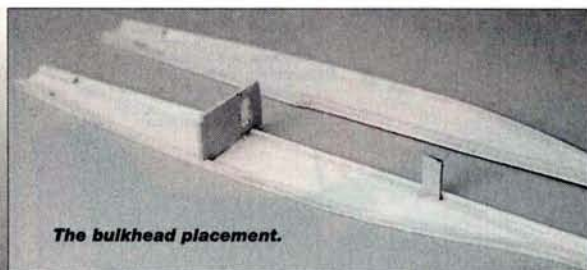
OK, this is motor on full power. If it is not climbing steeply, it is so fast that it will Dutch roll in level flight if left straight and level. The key is to just do tricks while the motor is full on.

• Aerobatics

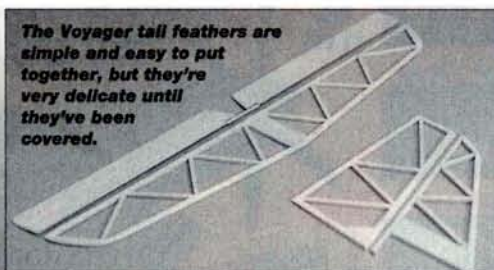
Double wow! The first time I did rolls in front of the "glider people," one said, "I didn't know polyhedral planes would roll." Another said, "Those are axial rolls. How do you do that without ailerons?" The answer is that you just hold the rudder hard over and jack the elevator up when the plane is upright and down when it's inverted. It also loops beautifully, spins, snap-rolls, flies inverted and on and on.

About the author

Jim Simpson is a veteran reviewer and designer of various types of R/C model airplanes and flew his first electric model in 1976. Jim was so impressed with the performance of the K&A Voyager that he has built seven of them so far. Jim lives and flies his planes in Rancho Rio, NM.



The bulkhead placement.



The Voyager tail feathers are simple and easy to put together, but they're very delicate until they've been covered.

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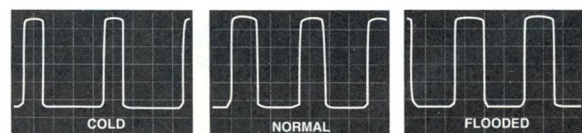
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Zirolli, (see Nick Zirolli).

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If you can, send your answer to *Model Airplane News*, **Name That Plane Contest** (state issue in which plane appeared), 100 East Ridge, Ridgefield, CT 06877-4606.



Congratulations to Christopher Pratt of Campbell, CA, for correctly identifying the November '96 mystery plane. The Curtiss P-40Q was a single-seat fighter equipped with a water-



injected Allison V-1710-121 engine. The last experimental P-40 design, this "cleaned-up" version of the Warhawk featured clipped wings with squared tips, a blister-type sliding cockpit hood, a shallower rear fuselage and a redesigned main fuselage with the coolant radiators moved to the wings. After WW II, the P-40Q competed in civilian air races. During a 1947 Thompson Trophy race, the engine failed and the plane

crashed; pilot Joe Ziegler bailed out and escaped unharmed. Thanks to all who wrote in; good luck next month! ✈

The winner will be drawn four weeks following publication from correct answers received (on a postcard delivered by U.S. Mail), and will receive a free one-year subscription to *Model Airplane News*. If already a subscriber, the winner will receive a free one-year extension of his subscription.



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HOBBYIST

MAGAZINE BACK ISSUES—*American Modeler, American Aircraft Modeler, Aeromodeller, Model Airplane News, Model Aircraft, RCM* and more; 1930s–1990s. For list, send SASE to Carolyn Gierke, 1276 Ransom Rd., Lancaster, NY 14086. [3/97]

CASH FOR ENGINES: ignition, glow, diesel—all types; any condition; sale list, too! Estates my specialty! Send SASE for list. Bob Boumstein, 10970 Marcy Plaza, Omaha, NE 68154; (402) 334-0122. [2/97]

WANTED: Model engines and racecars before 1950. Don Blackburn, P.O. Box 15143, Amarillo, TX 79105; (806) 622-1657. [10/97]

WANTED COX BOATS: Water Wizard, See Bee, Hydro-Blaster, Dean, 4032 Iowa St., San Diego, CA 92104. [12/96]

ENGINES: IGNITION, GLOW, DIESEL—new, used, collectors, runners. Sell, trade, buy. Send \$3 for huge list to Rob Eierman, 504 Las Posas, Ridgecrest, CA 93555; (619) 375-5537. [5/97]

MODEL AIRPLANE NEWS, 1930–1980; "Air Trails," 1935–1952, "Young Men," 1952–1956; "American Modeler," 1957–1967; "American Aircraft Modeler," 1968–1975. \$1 for list. George Reith, 3597 Arbutus Dr. N., Cobble Hill, B.C., Canada VOR 1L1. [3/97]

WANTED: Old, unbuilt, plastic model kits from '50s and '60s. Send list, price to Models, Box 863, Wyandette, MI 48192. [2/97]

TOY METAL OUTBOARD BOAT MOTORS WANTED: Mercury, Johnson, Fuji, Oliver, Gale, Evinrude, Orkin, Sea-Fury, Scott, Gronowski, 140 N. Garfield Ave., Traverse City, MI 49686-2802; phone (616) 941-2111. [1/97]

DEBOLT PLANS: radio control, control line, free flight. Separate SASE for each list. Fran Ptaszkiewicz, 23 Marlee Dr., Tonawanda, NY 14150. [3/97]

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WANTED: Cox Curtiss Pusher kits, parts and motors. Dave Warrick, Box 42, West Point, CA 95255-0042; (209) 293-1249. [2/97]

SUPERTIGER G-4500: broken-in, never flown—\$250. Randy (972) 529-1300. [3/97]

BYRON HUSKY: potential wing strut failure. Free information. Write to Ron Smith, P.O. Box 926, Sequim, WA 98382. Please supply details about crash if Husky wing failed. [3/97]

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COLLECTORS-FOR SALE/TRADE. All (10) plastic Monogram 50th Anniversary (reissue) P-51 Phantom kits, (see through) wrapped. Like ignition engines, balsa kits, race cars. (303) 422-0408. [2/97]

WANTED: Built or partially built scale Cessna 150, 152, or 172. Glen Mills, P.O. Box 3393, Mission Viejo, CA 92690; phone (714) 768-0585; fax (714) 458-6455. [7/97]

WANTED: TOY OUTBOARD BOAT MOTORS. Johnson, Mercury, Orkin, Fuji, Scott, Oliver, Evinrude, Gale Sovereign, Sea-Fury, Super Tigre, Lepage Monteleone. No plastic motors wanted. Gronowski, 140 N. Garfield Ave., Traverse City, MI 49686-2802; Ph. (616) 941-2111. [5/97]

WANTED: 1950's Berkeley Tri-pacer kit, larger model with a 44-inch wingspan. Write: Pat Murphy, P.O. Box 411, Sussex, WI 53089-0411; or call (414) 538-4437. [4/97]

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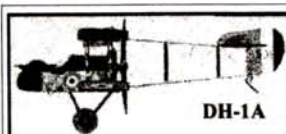
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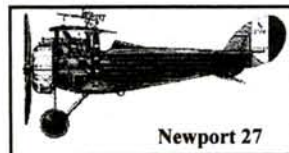
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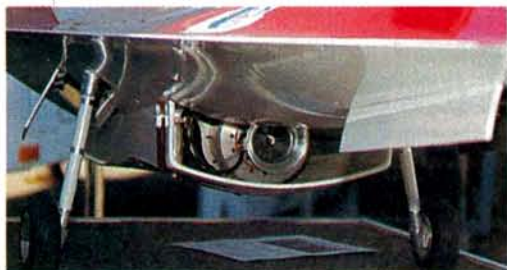
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LOFLYTE— THE AIRPLANE THAT LEARNS

THE NATIONAL AEROSPACE PLANE (NASP) was one of the most ambitious aeronautical projects ever undertaken. The U.S. government spent billions of dollars to develop a hypersonic aircraft capable of carrying people from Los Angeles to Tokyo in two or three short hours. After several years, scientists and engineers decided that materials, propulsion and control-systems technologies were not advanced enough to make NASP feasible, so the project was canceled. Yet hypersonic research is not dead in the United States. Several of the technology-development programs that began under the NASP umbrella have continued since its demise; we are now beginning to see some of the fruits of that research.



The engine rests in a pod on the underside of the aircraft.

LoFLYTE, the brainchild of Accurate Automation Corp.'s Robert Pap, is a multi-vehicle project whose main purpose is to demonstrate the feasibility of using an advanced neural network to control a hypersonic vehicle. While the ultimate demonstration of LoFLYTE technology will occur at hypersonic speeds, the project has begun with a 100-inch, low-speed, radio-control model of a NASA Langley Research Center aerodynamic design. Flight testing of this model will commence at the NASA Dryden Flight Research Center at Edwards Air Force Base in California in November 1997.

Once all the subsystems have been installed and are working properly, the current LoFLYTE model will be the most advanced radio-control model I

have ever seen. In fact, Unmanned Aerial Vehicle (UAV) is a more accurate term for this caliber of flying machine. Power comes from a Jeff Seymore-developed SWB-3 miniature gas turbine with an output of 38 to 42 pounds of static thrust. A neural-air-data system determines angle of attack, sideslip and velocity. A spread-spectrum telemetry system transmits data to the ground, allowing a ground-based personal computer to display the data in real time. A nose-mounted camera gives the pilot an out-the-cockpit view during flight. LoFLYTE uses several other unique subsystems, but the most exciting of all is an advanced neural-network-processor (NNP) flight-control system.

The initial flight tests of LoFLYTE will be completed with a conventional open-loop model aircraft control system. Data from these flights will be used to develop a mathematical model of the vehicle, which will be used by a conventional microprocessor to control the aircraft in the second phase of tests. During these flight tests, the center of gravity will be moved aft until the aircraft is flown in an unstable condition. Finally, the NNP will be installed and test flown.

The neural-network control system is truly the heart of the LoFLYTE project. According to an Accurate Automation Corp. (AAC) status report, Accurate Automation's Neural Network Processor "is a massively parallel, multiple instruction/multiple data implementation that is capable of more than 140 million connections per second with 8,000 neurons." Neural networks have the ability to do something that other systems can't; they can learn. They have an extraordinary ability to recognize patterns. What does this mean to the aeronautical community? A great deal! Modern combat and even transport aircraft depend almost entirely upon the control-system software,

or "control laws," for the vehicle's stability and control characteristics. Every year, the aerospace industry spends hundreds of millions of dollars to create, modify and upgrade the control laws for aircraft. Thousands of hours of simulator time are required to test new control laws and any changes made to existing ones. If the NNP works as described, it will automatically recognize the flight



Jeff Seymore, gas-turbine developer, standing next to the LoFLYTE model.

patterns of a new aircraft and write its own control laws, eliminating the need for so many thousands of hours of research and development.

The NNP has a long way to go before such dreams become reality. Yet we must always keep the future in mind, using our imagination to envision the wild, the ridiculous and the impractical, or technology will advance at a snail's pace. The lifting-body concept began in the early 1960s with Dale Reed flying a radio-control model of the M2-F1. This technology resulted in the space shuttle orbiter and, more recently, the X-33. Who knows where neural-network technology will lead? Perhaps someday we will hear a real Jean-Luc Picard say to his first officer as he leaves the bridge of his intergalactic spaceship, "Mr. Data, you have the helm." Only time will tell.

—David B. Eichstedt ✦



A view from the rear of LoFLYTE.